

# The Mining Journal

## RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1734.—Vol. XXXVIII. LONDON, SATURDAY, NOVEMBER 14, 1868.

{STAMPED...SIXPENCE,  
{UNSTAMPED...FIVEPENCE

**MR. JAMES CROFTS, STOCK AND SHAREBROKER,**  
No. 1, FINCH LANE, CORNHILL.  
(Established 1842.)

HOLDERS of mining shares difficult of sale in the open market may find purchasers for the same through Mr. CROFTS' agency. Also parties requiring advice how to act in the disposal or abandonment of doubtful mining stocks may profitably avail of Mr. CROFTS' long experience on the market in all cases of doubt or difficulty, legal or otherwise.

**NEW WHEEL LOVELL** is attracting much attention, they having been largely sold to the Cornish people. The shares are worth 22s. 6d., and the report, which arrived on Thursday last, gives the total value of the different ends as £115 per fathom, and last week they sold for the value of £515, which left a profit on the month's working. The mine must very soon come to dividends.

**SOUTH GREAT WORK** is spoken of very favourably, and the shares are very cheap at 7s. 6d. to 10s.

**AS CHIVERTON** mine the recent discovery appears of a permanent character, and is likely further to enhance the importance of this rich lead district. The shares are £4½, £4¼. CHIVERTON VALLEY should be bought for an advance.

**SPECIAL BUSINESS** in the above-mentioned mines.

**MR. JOHN BUMPUS, 44, THREADNEEDLE STREET,**  
has FOR SALE the following shares, free of commission:—

50 Australian United	20 Frank Mills, £2½	50 Royalton, £1 13s. 6d.
(Gold), 17s. 6d.	10 Great Vor, £18½	75 Rossa Grande,
50 Anglo-Brazilian, 13s.	25 St. John del Rey, 17s. 6d.	5 St. John del Rey, £18
15 Brynpostig, 7s. 6d.	5 Great Laxey, £21	20 So. Herodsfoot, £1
50 Bryn Gwlog, 7s. 6d.	50 Gen. Brazilian, 5s. 9d.	2 South Condurrow,
20 Chontales, £2½	10 St. No. Downs, £2½	1 West Wh. Seton, £19s.
15 Chiverton, £4½	50 Hingston Down, 6s.	5 Wt. Chiverton, £62½
50 Carn Camborne, 14s. 9	15 Marke Valley, £9 8s.	25 Wt. Great Work, £24
70 Drake Walls, 16s. 9d.	25 New Lovell, 19s. 6d.	30 Wt. Drake Walls, 9s.
50 Don Pedro, £3 18s. 9d.	50 No. Treskerby, 11s.	50 W. P. of Wales, 8s. 9d.
75 East Grenville, £4½	75 Prince of Wales, 30s. 6	2 Wt. Seton, £22½
35 E. Wh. Russell, 10s. 6	100 Princess of Wales, 4s. 6	25 W. Mary Florence, 19s.
30 E. Carn Brea, 11s. 6d.	75 Port Phillip, £2	15 Wheel Uny, £3½
70 Frontino, 14s. 9d.	50 Pestarena, £1 11s. 3d.	5 Wt. Mary Ann, £21.

**MR. WILIAM WARD,**  
STOCK AND SHAREDEALER,  
No. 29, THREADNEEDLE STREET, LONDON, E.C.

**MESSRS. WILSON, WARD, AND CO.,**  
STOCK AND SHAREDEALERS,  
16, UNION COURT, OLD BROAD STREET, LONDON, E.C.

**MR. THOMAS SPARGO, STOCK AND SHAREDEALER,**  
224 & 225, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.

**JOHN RISLEY, (SWORN) STOCK AND SHAREBROKER,**  
48, THREADNEEDLE STREET, LONDON, E.C.  
Business transacted in the British Funds, Railway and other Stocks, Foreign Bonds, &c., on the usual commission, 1¼ per cent. on mining and other shares, above £2; and at £2 and under 6d. per share.

Bankers: London and Westminster, Lothbury.

**MR. JAMES HUME, STOCK AND SHAREDEALER,**  
74, OLD BROAD STREET, LONDON, AND MINING EXCHANGE.  
Mr. Hume will give the full market prices for the following shares, viz.:—Don Pedro, Chontales, Chiverton, East Grenville, Grenville, Crebor, Prince of Wales, Great Vor, East Caradon, South Condurrow, Wheel Uny, Drake Walls, &c.

Cash on receipt of transfer.

Money advanced on Shares or Stocks, for long or short periods.

Business done at a margin of 1¼ per cent.

Bankers: The London Joint-Stock Bank.

**BARTLETT AND CHAPMAN, STOCK AND SHAREDEALERS,**  
2, BUCKLESBURY, LONDON, E.C., are in a position to impart special information to intending purchasers in Wheel Chiverton, Great South Chiverton, East Chiverton, Lovell Consols, Tamar Valley, Trumpet Consols, and Royalton Mines.

**LOVELL CONSOLS**—The mine in the adit has been drained by the 12 fathom level, and on Thursday they commenced sinking on the lode, which is 2 feet wide, and worth from £20 to £30 per fathom.

**NORTH JANE**—Shares should be secured; they will have a speedy advance. It must be remembered that this mine has the same lodes as Wheel Jane, which advanced within the last few months from £2 to £40 each, and will have a still further rise. Tin in rising, and we recommend our friends and clients to watch properties of this kind.

Our "Investment Circular" forwarded on application.

Bankers: London and Westminster.

**MESSRS. WARD AND JACKMAN,**  
STOCK AND SHAREDEALERS,  
No. 1, CUSHION COURT, OLD BROAD STREET, CITY, E.C.

Members of the Exchange.

Closing prices, Friday Evening, Nov. 13.

Carn Brea .....	£ 18 to £ 20	North Treskerby .....	8s " 10s
Chontales .....	2½ " 3	Prince of Wales .....	1¼ to £ 13½
Chiverton Valley .....	3½ " 4½	Port Phillip .....	38 " 40s
Chiverton Moor .....	6 " 6½	St. John del Rey .....	17½ " 18½
Cook's Kitchen .....	11½ " 12½	Tineroft .....	16½ " 16½
Don Pedro .....	3½ " 3½	West Chiverton .....	62 " 64
East Caradon .....	5½ " 5½	W. Caradon (£2 call pd.) .....	3 " 4
East Grenville .....	3½ " 4½	West Drake Walls .....	7s " 8
East Lovell .....	8 " 8½	West Wh. Frances .....	33 " 35
Frank Mills .....	9 " 9½	West Wheel Seton .....	190 " 195
Great Laxey .....	20½ " 21½	Wheel Grenville .....	1½ " 1½
Great North Laxey .....	1½ " 1½	Wheel Mary Ann .....	19½ " 20½
Great Wheel Vor .....	12½ " 13½	Wheel Seton .....	50 " 52½
Herodsfoot .....	44 " 46	Wheel Uny .....	3 " 3½
Marke Valley .....	9 " 9½		

Messrs. WARD AND JACKMAN are DEALERS in all the above at the close market price of the day.

Messrs. WARD AND JACKMAN have daily information from the principal seats of mining, which is at the service of those who may honour them with their confidence.

Messrs. WARD AND JACKMAN beg to refer to their remarks on p. 309.

Nov. 13. Bankers: London and Westminster, Lothbury.

**MR. C. A. POWELL, SHAREDEALER, 78, OLD BROAD STREET, LONDON, E.C.**  
Transacts BUSINESS as BUYER or SELLER in the various shares currently dealt in at net prices.

Parties dealt with at a fair margin on the market price.

Bankers: City Bank, Finch-lane.

**MR. WILLIAM MARLBOROUGH, 1, GREAT ST. HELEN'S,**  
BISHOPSGATE STREET, LONDON, E.C. (Established 14 years), has FOR SALE the following SHARES, at net prices:—

50 Anglo-Brazilian, 10s. 6d.	20 Herodsfoot, £46½	2 W. Frances, £33 18s. 9
20 Calbeck Fells, 11s. 9d.	5 Marke Valley, £2½	1 West Seton, £199½
20 Chontales, £2 16s. 9d.	20 North Downs, 15s. 9d.	50 Wheal Crebor, 30s. 9d.
25 Chiverton, £4 6s. 9d.	30 No. Treskerby, 8s. 9d.	40 Wh. Grenville, 30s. 9d.
10 Chiverton Moor, £6 6s. 3	20 North Crofty, 32s. 9d.	10 Kitty (St. Agnes), £2½
3 Cook's Kitchen, £11½	40 Prince of Wales, 38s. 6	25 West Godolphin, 21s.
20 Don Pedro, £3 3s. 9d.	2 Providence, £27½	10 West Caradon, £23½
50 Drake Walls, 15s. 3d.	20 Fort Phillip, £41s.	3 Wh. Mary Ann, £19½
5 East Caradon, £25½	30 So. Condurrow, 18s. 9d.	1 Wheel Seton, £21.
20 E. Grenville, £3 18s. 9	5 St. John del Rey, £18½	20 Wheel Uny, £2 9d.
5 East Lovell, £24½	5 Stray Park, £7½	5 W. Margaret, £5 1s. 3
5 Frank Mills, £3 6s. 9d.	50 Tamar Valley, £24	50 West St. Ives, £2
50 Frontino, 14s. 6d.	5 Tineroft, £16.	10 W. Gt. Work, £2 13s. 9
2 Great Wh. Vor, £13½	1 Wt. Chiverton, £62½	20 Yudanamutana, £2½

And is a BUYER of Stray Park, West Godolphin, Cwm Erfin, East Darren, and Cargill shares at market quotations.

**MR. GEORGE BUDGE, STOCK AND SHAREDEALER,**  
No. 4, ROYAL EXCHANGE BUILDINGS, LONDON, E.C. (Established 20 years), is a SELLER of:—30 Colquhoun and Callington United, £2 2s. 3d.; 25 North Downs, 12s. 3d.; 20 Wheal Grenville, 32s. 6d.; 30 Drake Walls, 16s.; 50 West Drake Walls, 7s. 9d.; 100 West St. Ives, 6s.; 2 West Chiverton, £62½; 1 West Seton, £196; 10 Chiverton Moor, £6½; 25 Rose and Chiverton United, £110; Princess of Wales, 5s.; 45 West Wheel Kitty; 20 North Treskerby, 3s.; 50 Camborne Vein, 10s.; 25 North Chiverton; 40 East Carn Brea, 3s.; 100 Red-moor, 2s. 3d.; 2 West Caradon, £5 (call paid); 35 Calbeck Fells; 50 Great South Chiverton; 5 East Lovell, £23½; 110 Lovell Consols; 4 Stray Park, £8; 95 Tamar Valley; 80 Gwydyr Park, 4s. 3d.; 60 East Chiverton; 5 Mace-y-Safn, £24; 60 Okei Tor; 60 Taquaril Gold.

**SPECIAL BUSINESS** in Devon Great Consols, Great South Chiverton, Cape Copper, Colquhoun and Callington, Royalton, South Herodsfoot, West Wh. Kitty.

**CORNISH AND FOREIGN MINES—**  
TO SHAREHOLDERS AND OTHERS.

**PETER WATSON'S "WEEKLY MINING CIRCULAR AND SHARE LIST—**  
SYNOPSIS OF CORNISH AND DEVON MINES," of Friday, Nov. 13, No. 506, Vol. X., price 6d. each copy, forwarded on application, contains information on the following mines:—

Chiverton.	North Roskear.	Prince of Wales.
Wheel Jane.	Wheal Uny.	Cargill.
West Chiverton.	Prosper United.	Ding Dong.
East Wheel Seton.	Wheal Mary Ann.	Great Wheal Vor.
North Wheel Crofty.	North Wh. Chiverton.	Great Laxey.
West Great Work.	Tineroft.	Great North Laxey.
South Great Work.	Trumpet Consols.	West Caradon.
Botallack.	East Wheel Lovell.	Wheal Buller.
Dolcoath.	East Trumpet.	New Wheal Lovell.
Stray Park.	Frank Mills.	Marke Valley.
Clifford Amalgamated.	Drake Walls.	Wheal Treawny.
West Wheel Seton.	West Drake Walls.	Chontales.

With Remarks on Tin, Copper, and Lead Mines.

**INVESTMENT OR SPECULATION.—A SELECTED LIST OF**  
RAILWAYS, BANKS, MINES, COLONIAL SECURITIES, FOREIGN GOVERNMENT BONDS, &c., forwarded to bona fide investors on application, in addition to the high rate of interest many of the above are paying, there is now every probability of a great rise in market value.

**PETER WATSON, STOCK AND SHAREDEALER,**  
79, OLD BROAD STREET, LONDON

(three doors only from Hercules-passage, entrance to the Stock Exchange).

Twenty-four years' experience.

(Two in Cornwall and Twenty-two in London.)

Bankers: The Alliance Bank, and the Union Bank of London.

References given and required (when necessary) in all the principal towns of the United Kingdom.

**THE LONDON DAILY RECORD—STOCK AND SHARE**  
LIST—STOCK EXCHANGE SECURITIES. Published every evening at 5 o'clock. It contains the latest prices of railways, banks, mines, foreign stocks and bonds, financial, insurance, and miscellaneous shares, remarks on the daily rise and fall in prices, with advice as to purchase and sales. Annual subscription, £1 1s.; by post, £2 5s.; monthly subscription—by post, 4s.; single copy, 1d.; by post, 2d.

**PETER WATSON, Stock and Sharedealer, 79, Old Broad-street, London.**

**MR. EDWARD COOKE,**  
FOREIGN AND BRITISH STOCK AND SHAREDEALER,  
75, OLD BROAD STREET, LONDON, E.C.

Deals in all kinds of Foreign Stocks, and the shares of the various Gold Mines, also in the best Dividend and Progressive Mines.

See weekly article on page 309.

A Price List sent free on application.

Bankers: Alliance Bank.

**MR. W. H. CUEL,**  
No. 42, CORNHILL, LONDON, E.C.

**MR. G. D. SANDY, STOCK AND SHAREDEALER,**  
No. 48, THREADNEEDLE STREET, LONDON, E.C.

TAMAR VALLEY.—My advice is, buy these shares. Full particulars on application.

**WALTER TREGILLAS, 122, BISHOPSGATE STREET**  
WITHIN, LONDON, E.C. DEALS in all STOCKS AND SHARES, either for cash or the fortnightly settlement.

**SPECIAL BUSINESS** in the following Gold Mines:—

Don Pedro.	General Brazilian.	Frontino and Bolivia.
Taquaril.	Rossa Grande.	Chontales.
Port Phillip.	Anglo-Brazilian.	

Bankers: The Alliance Bank.

**MR. E. J. BARTLETT, STOCK AND SHAREDEALER,**  
No. 50, GREAT ST. HELEN'S, LONDON, E.C., has SPECIAL BUSINESS as a BUYER or SELLER of shares in West Godolphin, Summer Hill, North Pool, and New Lovell.

E. J. B. deals in every description of Mining, Insurance, and other Stocks and Shares, and invites transactions from holders of stock difficult of sale in the open market.

**MR. JOHN MOSS, STOCK AND SHAREDEALER,**  
76, OLD BROAD STREET, LONDON, E.C.

Has BUSINESS as BUYER or SELLER in all British and Foreign Mines.

**SPECIAL BUSINESS** in Calbeck Fells, Chiverton, Chontales, Frontino, and Prince of Wales.

Bankers: City Bank, Finch-lane, E.C.

**MATTHEW GREENE, STOCK AND SHAREDEALER,**  
1, ST. MICHAEL'S HOUSE, CORNHILL, LONDON, E.C.

Must advance in price—

TAMAR VALLEY SILVER-LEAD AND NEW CLIFFORD COPPER MINES.

Full particulars on application.

**INTENDING INVESTORS.—The "FINANCIAL GAZETTE"**  
published by Mr. Y. CHRISTIAN, should be consulted with a VIEW to the SAFE EMPLOYMENT OF CAPITAL. It contains Original Articles, a Review of the Money Markets, and a selection of Investments paying 10 to 17 per cent., and such information as is necessary to guide intending investors.

6, Bond-court, Mansion House, London, E.C.

Bankers: Bank of England.

**INVESTORS IN MINING COMPANIES.—**  
Mr. CHRISTIAN recommends the immediate PURCHASE of NORTH LEVANT SHARES, whether bought to hold as an investment or to sell again. It is a splendid property, and dividends are close at hand. Although Mr. CHRISTIAN is the only person publicly recommending the purchase of shares in this set, he does so with the greatest of confidence, feeling assured that those who buy now will do well.

**MR. T. ROSEWARNE, 81, OLD BROAD STREET,**  
LONDON, E.C.

T. R. has BUSINESS in the following mines, at close market prices:—

Calbeck Fells.	East Caradon.	West Chiverton.
Chiverton.	East Basset.	West Seton.
Chontales.	Frontino and Bolivia.	Wheal Agar.
Carn Brea.	Great Wheal Vor.	Wheal Crebor.
Cook's Kitchen.	Marke Valley.	Wheal Grenville.
Devon Consols.	North Downs.	Wheal Seton.
East Grenville.	North Roskear.	Wheel Uny.

T. R. is in a position to give advice respecting Prince of Wales, Chiverton, and Chiverton Moor Mines, having had these three properties inspected again this week. Parties desirous of dealing in these shares should consult T. R. at once, as money can be made by acting in the right way. I have hitherto been right in my opinion of these mines, having inspected them myself with other competent agents.

Money advanced to any extent on good mining shares.

Office hours Ten to Four. Bankers: Bank of England.

**TO CAPITALISTS AND INVESTORS.**

**MESSRS. T. A. MUNDY AND CO. have FOR SALE**  
A QUANTITY OF MISCELLANEOUS SHARES, many of them very great bargains, and unobtainable through any other channel. Dividends may be safely secured varying from 8 to 20 per cent.

Special attention given to bona fide English and Foreign Mining Shares.

MISCELLANEOUS SHARE EXCHANGE.

38, BISHOPSGATE STREET, WITHIN, LONDON, E.C.

**MR. THOMAS THOMPSON, MINING OFFICES,**  
12, OLD JEWRY CHAMBERS, LONDON, E.C.

**ROYALTON.**—The steady increase in the price of tin is causing a great demand for shares in legitimate tin mines, and which, there can be little doubt, will become generally valuable. Investors, however, should be careful how they place money in deep and expensive mines, which can only pay profits with tin at high prices. They should rather seek an investment in those mines which, with extensive reserves, can pay profits with tin at its lowest price. Among the best of this latter class I place Royalton, and recommend the purchase of the shares wherever they may be met with. At their present price they are intrinsically very cheap indeed.

**MR. CHARLES THOMAS,**  
MINING AGENT, GENERAL SHAREDEALER, AND AUCTIONEER,  
3, GREAT ST. HELEN'S, LONDON, E.C.

Third Edition, price One Shilling; post-free, fourteen stamps.

**MINING FIELDS OF THE WEST:**  
A PRACTICAL EXPOSITION OF THE  
PRINCIPAL MINES AND MINING DISTRICTS OF CORNWALL AND DEVON.  
Published by CHARLES THOMAS,  
At No. 3, Great St. Helen's, London, E.C.

**MESSRS. LANE AND GIBBS, 2, ROYAL EXCHANGE,**  
LONDON, E.C. (Members of the Exchange), STOCK AND SHARE-  
DEALERS, transact business in all kinds of securities at closest net prices for cash or account.

**MARKET VALLEY, EAST CARADON, WEST ROSE DOWN, and CARN CAMBORNE**  
MINES.—Although difficult to effect transactions in these mines at times on the Mining Market the advertisers are always in a position amongst their correspondents to buy and sell at close prices, and they do not hesitate to recommend a purchase in each and all of the above for a great advance in price and large dividends.

**GREAT LAXEY and SOUTH DARREN.** SPECIAL BUSINESS in these mines.

Bankers: London and County Bank.

Established Twelve Years.

**MR. FREDERICK WM. MANSELL, 44, THREADNEEDLE-**  
STREET, LONDON, is in a position to deal in all shares quoted on the last page of this day's Journal, and has FOR SALE the following, free of commission:—

15 E. Caradon, £2½	10 Marke Valley, £2½	50 Don Pedro, £2½ pm.
70 So. Condurrow, 20s.	2 Providence, £28.	20 Cape Copper, £12½
5 Great Laxey, £21½	50 No. Treskerby, 8s. 9d.	10 City of Moscow (Gas), £5.
3 Wt. Chiverton, £61½	25 Grenville, 31s. 6d.	100 General Brazilian, 5s.
10 Chiverton, £4½	2 Seton, £53.	premium.
100 Prince of Wales, 40s.	30 Drake Walls, 17s. 6d.	20 Hudson Bay, £14½.
50 E. Grenville, £4 1s. 3d.	5 Great Vor, £13½	50 Frontino, 16s.
1 West Seton, £19s.	50 Chontales, £2½	30 Fortuna, £2½.

Nov. 13, 1868. Bankers: London Joint Stock Bank.

**MR. WILLIAM SEWARD, STOCK AND MINING SHARE**  
BROKER, 19, THROMMORTON STREET, LONDON, E.C.

Every description of shares BOUGHT and SOLD at the best market prices.

**MR. EMANUEL BEAZLEY,**  
STOCK AND SHAREDEALER,  
3, CROWN COURT, THREADNEEDLE STREET, LONDON, E.C.

**MR. J. H. COCK, STOCK AND MINING SHAREDEALER,**  
74, OLD BROAD STREET, LONDON, E.C.

Fifteen years' experience in Cornwall and London.

**SPECIAL BUSINESS** in Providence, Margaret, South Condurrow, Drake Walls, East Grenville, and Chontales.

**CHONTALES GOLD COMPANY.—FULL PARTICULARS**  
OF THE DIFFERENT CLASSES OF SHARES can be obtained on application to Mr. J. H. MURCHISON, No. 8, Austinfriars, E.C.

**MR. HENRY MANSELL,**  
44, THREADNEEDLE STREET, LONDON, has FOR SALE at net prices:—

50 E. Carn Brea, 9s. 6d.	10 West Caradon, £3
15 Chiverton Moor, £6½	5 Great Laxey, £21.
100 Chontales, £2 18s. 9d.	5 Great Wh. Vor, £13.
20 Drake Walls, 18s.	20 St. Calbeck, £2½
100 East Grenville, £4.	100 Prince of Wales, 38s.
10 East Caradon, £5½	50 Redmoor, 4s.
Mr. H. M. advises the immediate purchase of Tamar Valley, South Condurrow, and Great South Chiverton shares.	

Thirteen Years' Experience.

Bankers: London Joint-Stock Bank.

References exchanged.

**MR. J. B. REYNOLDS, STOCK AND SHAREDEALER,**  
70 and 71, BISHOPSGATE STREET WITHIN, LONDON, E.C.

Mines inspected by competent authorities on reasonable terms.

Established Eleven Years.

Bankers: City Bank.

References exchanged in any part of the United Kingdom. Parties of well-known respectability can have stock prior to payment if desired.

**VALUABLE MINING PROPERTY.—The UNDERSIGNED,**  
from an extended experience in the Mining Share Market, is confident that a good OPPORTUNITY now presents itself to INVESTORS in BRITISH MINES, especially the mine the present price of the share may be selected to pay handsomely. Full particulars of one mine that cannot fail to advance cent. per cent. on present price will be forwarded on application to Mr. JOHN R. PIKE, 3, Crown Chambers, Threadneedle-street, London.

**BRAZILIAN INVESTMENTS.**

**MINING AND AGRICULTURAL PROPERTIES** in this favoured country TO BE LEASED or SOLD.

For particulars, address C. WILLIAMS, Esq., 35, Coleman-street, E.C.

**MR. J. N. MAUGHAN, STOCK AND SHAREBROKER**  
(Member of the Stock Exchange),  
No. 2, COLLINGWOOD STREET, NEWCASTLE-ON-TYNE,  
Bankers: Messrs. Lambton and Co.

**MR. J. S. MERRY,**  
ASSAYER AND ANALYTICAL CHEMIST,  
SWANSEA.

**RAILWAY SHAREHOLDERS,** or those thinking of becoming so, should READ HANNAM AND CO.'S JUNE CIRCULAR, free by post from either of their offices, 449, STRAND, LONDON, W.C., or ROYAL INSURANCE BUILDINGS, MANCHESTER.

**FOREIGN STOCKHOLDERS,** or those thinking of becoming so, should read HANNAM AND CO.'S JUNE CIRCULAR.

**ANGLO-AMERICAN OR ATLANTIC CABLE STOCKS.**—All interested in these undertakings, or about to become so, should read HANNAM AND CO.'S MARCH and APRIL CIRCULARS, as well as JUNE CIRCULAR.

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## The Royal School of Mines, Jermyn Street.

## MR. WARINGTON SMYTH'S LECTURES.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE I.—Mr. SMYTH (who was received with applause by a more numerous class than has been usual in the last year or two) said—I have great pleasure in commencing this series of sixty lectures on the subject of MINING, although it is a more extended course than most of those delivered in this place, and might seem unnecessarily long to those who have not seen anything of mining practice; but we must remember that it is a subject of great importance, which thoroughly to master would oblige us to go into details to fully three times the extent we shall, even with sixty lectures, have the opportunity of doing. The vast importance to the community of mining enterprise and operations in England cannot be more forcibly shown than by a reference to the mineral statistics lately published by Mr. Hunt. His figures give a notion, in a few brief lines, of the extraordinary value of the mineral resources of this country; and I may mention as the most remarkable of these items that the annual value at the pit's mouth of the coal alone is twenty-six millions sterling; that of the iron ore, also at the pit's mouth, is three millions; and that the total value of the mineral substances, metallic and non-metallic, annually raised from the bowels of the earth in this country amounts to no less a sum than forty-three millions sterling. These large amounts are sufficient to give an idea of the vast numbers of persons who are employed, and whose existence, comfort, and prosperity depend upon the raising of these gigantic masses of mineral matter. (Cheers.) Moreover, when we recollect that the process of production has been going on for centuries in respect to certain minerals, and for a great number of years in respect to the other mineral substances, we shall appreciate the fact that the necessary operations become more and more difficult as the researches of the miners are carried to greater depths, and the greater intercommunication which now exists between nations exposes them to closer and closer competition with foreign countries. An intimate knowledge, therefore, is most needful for all those who are called upon to take part in mining operations of all that art, and science, and experience has already achieved and discovered with respect to the best and most economical means of winning the treasures hidden from our eyes beneath our feet. The very nature of the work indicates the difficulties to be encountered in our land, where large quantities of water have to be pumped up, the presence of which involves constant trouble, risk, and expense, only to be appreciated by those who have worked in the shallower mines which the foreign countries competing with us have the good fortune to possess. There are in this country few districts yet unwrought, and in some, particularly those of the South-West, the miners have now to sink to much greater depths than their predecessors probably ever contemplated. Whether we cast our eyes over the somewhat exhausted portions of the North of England, or the metallic mines of the South-West, where we look at the midland districts, or the Welsh coal and mineral deposits, we still find that the mines have long been, and are now, constantly increasing in depth. Everything, in short, goes to show that more skill and greater knowledge of science are indispensable, if we would maintain the successful results to which we have been accustomed, and which contrast so favourably with the works of competing nations. The history of mining resolves itself into different groups of facts corresponding with three distinct periods. There is the *Ancient Period*, which we read of in classic authors, when great quantities of the native metals, and especially of gold, were obtained with great facility both in Europe and Asia. There were no productive mines in Africa, Macedonia, Cyprus, Egypt, and other countries—to say nothing of the golden sands of various rivers, which were largely worked in those days by various rude operations, to which very few persons, except slaves, desired to lend themselves. With that application of forced labour very little skill in the workers was fostered. When a man died the little he knew died with him, and all modern examinations of the ancient works prove that the operations were of the rudest and most wasteful character. With the *Middle Ages* came a very different state of things. Great advances were made in the knowledge of the physical sciences, particularly in Germany, and more especially in the practice of mining. Persons of high station and great learning went into mining as adventurers—speculators, that is—on a large scale. Excavations of a remarkable character were then carried to depths rarely exceeded even in these days, and that more especially in the Hartz and Alps. In the more *Modern Period* we have not the advantage of dealing with deposits in virgin ground, a great proportion of those now worked having been before attacked, and followed out to easy depths. The modern miner, moreover, is often called upon to open abandoned mines under circumstances frequently of great difficulty and insecurity. If, however, we have not the advantage of virgin ground, as the older miners had, we have great advantages over them in respect to the great stores of accumulated knowledge which we possess with regard to mining operations themselves, and the vast advances made in mechanical science, enabling the works to be carried on under circumstances which could not have been encountered in the earlier times at all, or, if they could, without any profitable or satisfactory results. The greater and more rapid intercommunication with different countries, which is now so easily kept up, our improved roads, canals, and railways at home, and steam communication by sea, with supplies of material, facilitate in a great degree the workings of mines now-a-days. Then, again, we must recollect that the marvellous activity of modern invention has brought within reach improved machinery of a character more perfect and effective than could in former days be possibly attained. Another point of advantage is the greater abundance and cheapness with which many materials can be obtained—such as fuel, iron, steel, and other things in constant and indispensable use in mines. It is probable that ere long there may be further important changes to add, for we know that the art of mining must be constantly advancing simultaneously with the advances made in other arts and in scientific knowledge. The Art of Mining is a knowledge of the processes by which the useful minerals are obtained from their natural localities, sometimes below the surface and sometimes at the surface of the earth's crust, as in quarrying, where certain deposits are worked on a large scale in the light of day. To these it is usual to add the arrangements for mechanically preparing the ores for market, or for rendering the minerals more suitable for several different uses. Thus, the minerals are raised in bulk, and mingled with impurities which it is not desirable to carry away. These impurities can mostly be got rid of with advantage on the spot, where there is mostly cheap water-power to be had necessary for the purpose of breaking up the ores, and separating them from the foreign substances associated with them, and other processes. The Art of Mining obviously, then, cannot be carried on with advantage without a knowledge of several branches of science, and particularly *Mineralogy, Geology, Mechanics, and Physics*. Mineralogy is necessary to distinguish those substances which it is the duty of the miner to seek, not only as to their qualities, but as to their peculiarities of occurring together in groups, and all the other matters which this science takes cognizance of. Then, Geology has to deal with the places in which the miner has to seek for the valuable minerals. This is of the highest importance, more especially when we have to do with minerals in the stratified rocks. I may here note that there is a great difference in seeking for metals in metalliferous mines, and in mining for coals, or iron ore, or building stone in the stratified deposits—the former being found in veins or lodes, by a tentative process, and requiring modification of so much variety that the actual beds and the depths at which they may be considered safe to occur are, to a great extent, certain and ascertained. Mechanics is the science which has to deal with the appliances required at every step in mining; and Physics are necessary to enable the mining engineer to judge of the best modes of encountering and overcoming the difficulties arising from the presence of water, of noxious gases, and of properly ventilating the extensive areas of underground perforations which successful mining involves. But the modes of applying all these sciences are not regular, and require modification of so much variety that they can only be fairly learnt by the actual experience gained by assisting personally in mining operations. This being so, it would appear, at first sight, that if all these sciences are needed in combination with much practical experience it would be difficult to obtain persons properly qualified to carry through in the best manner all the operations required from the commencement of a mine to a full measure of successful activity. No doubt it is difficult, supposing one man to have all these responsibilities thrown upon him; but, in the greater number of cases, it can be found that there are a number of men who have been brought up in a practical way to carry out certain portions of the work, and thus by every day's experience taught to apply these sciences in a certain fashion. In coal mines, indeed, the directing minds are those of men well educated, and thoroughly acquainted with the requisite sciences, as, indeed, the nature of the works to be carried out requires; but in mineral mines will be found men who have shown themselves to be thoroughly good workmen, afterwards acting as managers. It is almost impossible that such men should have a knowledge of the sciences, but they are able to trace effects to their cause, and the consequence is that, without any theoretical lore, they are conversant in a remarkable degree, with certain leading facts and principles of science, and are often particularly well skilled in discerning the changes and conditions which affect the presence and richness of minerals; these qualifications being only acquired after a great number of years' experience and hard labour, and at a great expenditure of time. The object of reading works on mining, and attending lectures on the subject, must not be misunderstood. They will not make up for want of experience; but it may be expected that if we have placed before us in a short time and in a clear manner the facts otherwise only to be learned by experience, a great saving of time will be gained, and by bringing a proper amount of industry and attention to the work as much may be learned in twelve months as would otherwise take five years to acquire. Knowledge so obtained may not be so impressed upon the pupils' minds, but it is most desirable that they should be acquainted with all the known facts touching the art of mining, which have resulted from the experience of other countries as well as that of our own. This is important, for there is now a great deal of time and money wasted in trying experiments which have already been worked out in other districts and countries, and of pursuing year after year systems which have been either superseded or greatly changed for the better elsewhere. I can now only just glance at the difficulties which beset the path of the miner, and point out how needful it is that he should be acquainted with these branches of knowledge. He should of necessity be well acquainted with the different classes of minerals which are associated together. This was a point so little attended to in former times that minerals of great value were entirely neglected, thrown into the rubbish heap, and so mixed up with valueless substances as to render it impossible to get them back again. It happened unfortunately that it was the custom to attribute special metals only to certain districts—as, for instance, tin and copper to the western counties, coal to certain coal fields, and so on; so that those whose education was purely practical, and obtained on the spot, very seldom had an opportunity of making themselves acquainted with the minerals of other districts, and hence these great losses. It is, therefore, greatly to be desired that local establishments of a scientific character, with proper museums and repositories of mining appliances, should be founded, where men may learn not only what is immediately under their own observation, but what is to be found, and what is known as to other districts. When we consider the different character of the various geological formations to which the miner is called upon to direct his energies, the value of scientific knowledge is most apparent. Taking England alone, what could be more diverse than the South-West and North of England mining districts, as regards geological conditions; and on the Continent the same contrast will be found between Spain, the North of Italy, and Germany. Thus, then, the subject of our lectures require, under this

heading, only a great amount of industry, and special education. Again, take the great depth to which many of our mines have penetrated, to illustrate which I have placed on the wall a drawing of the elevation of St. Paul's Cathedral, to the same scale as that of the shaft of the Samson Mine, at Andreasberg, in Saxony, and the latter exhibits a depth equal to six or eight St. Paul's piled upon each other, and that is reckoned a somewhat deep mine. Just remember, too, for a moment, the mechanical difficulties which supervene in the sinking of many shafts, in providing the means of clearing them from water, in the arrangements necessary to raise the minerals from the lower works to the surface, and last, but not least, of lowering and bringing up the workmen from those depths, and you will see at once that these are subjects which require much patient enquiry and instruction. A large mine, moreover, covers an enormous area. A section of the workings (of which there was a large example on the wall) is familiar to you. The black lines show the roadways by which the material is brought from the workings, and which only communicate with the surface at two or three points; and I must say that, dark, intricate, and narrow as these roads are, they are kept open for an immense traffic, carried on by means of many hundreds of wagons, and I have never seen a block like those which occur daily in Fleet-street and the Strand. Then to supply these intricate ways and far-works with good air in sufficient quantities, not only for breathing purposes, but to keep diluted to a point of safety the fire-damp which is constantly appearing in the workings, is but another section of those difficulties the miner has to cope with, and to describe and explain which it must seem that a course even of sixty lectures is really but a small portion of what is to be done. I propose to devote to each subject only with a few facts on a preliminary subject, but one which is of importance, and without a knowledge of which the miner cannot stir a step—I allude to the conditions under which persons are allowed to become mining adventurers, the amount that is to be paid to the owners of the mineral land, and the time in which the work is to be carried on. In various countries, as I have intimated, these arrangements are very diverse, although in the earlier times there was one uniform arrangement. It appears that in European countries in earlier days the land was given or conferred on certain persons, with the use of the surface only, the minerals under the surface being considered as belonging to the public at large, and retained in the hands of the reigning sovereign, prince, or chief, to be worked by him at his own charges. In other cases it might be let out to adventurers, to be worked for the public advantage, and altogether separate from the tenure of the land. In many European countries this principle holds good to the present moment—as, for instance, in France, Italy, Spain, and Germany, but in this country it has become modified to a considerable extent, and a sort of arrangement prevails, by which a portion of the minerals is given to the owner, and called a "royalty," a word which sufficiently testifies to the fact that the same arrangement must have originally obtained here as that on the Continent. The term "royalty," however, applies here to a certain fractional proportion belonging to the owner of the soil, gold and silver only being claimed by the Crown, and there are curious Acts of Parliament, passed at various times, with respect to cases where the gold and silver are so mingled with other materials that chemical processes have to be resorted to, and then a right is allowed of pre-emption, or of the purchase of the mixed material at a certain rate. All other metals—as tin, copper, iron, lead, &c.—are now indisputably the property of the owner of the surface. The English system, however, leads to many complications. Thus, a man may dispose of the surface, and reserve the minerals or a portion of them, and so there may be, and often is, in the West, one owner of the surface, another of the tin, a third of the other metals, and so on—so in some mines it is a task for the best arithmeticians to make out the sums due to the different owners. I mention these general facts because it is important to remember them, in order properly to appreciate the differences between the mining of private property and that of the Crown, and find that, for example, where the mines are worked on behalf of the Crown, we find that they are worked steadily over a large area, and with a view to the maintenance of a fixed population, a certain proportion of new ground being annually explored, with a view to further discoveries of profitable deposits; while in this country large amounts of capital are applied at once to mines from which, therefore, large profits in a short period are expected. It follows that, in Saxony, the mines last for centuries, instead of a few years, as in England. There is not so much inducement to private persons to mine where they are liable to be interfered with by Government agents, and, if we draw the comparison, we shall find that, although there is in our system something to regret, there is also something to admire. Here, when a mine passes into the hands of private persons, it is usual, first, to take it as a preliminary for twelve months, upon what is called a "back-note," after which leases of twenty-one years are commonly given. The object of the adventurers, therefore, is to obtain within that time as large a profit as possible, and the consequence is that capital is thrown into it, to bring the mine forward, and for that purpose all sorts of expedients are resorted to, some of which frequently will not bear the test of honest investigation. The mine is pushed forward rapidly, without caring for the distant future, and so they are apt to be worked into poverty, and abandoned at the end of the term. In many cases, however, where there is confidence that the lease will be renewed upon reasonable terms, and the adventurers are not needy men, a more provident system is adopted, and there are mines in Cornwall which have thus been profitably worked for a long series of years. Metalliferous mines have most effectively been worked in Cornwall and Devon, upon a system called the "Crown Lease System." In this system, the land is sold by a reversionary lease, for a term of years, and certain fixed intervals, to look at the books, and see that all debts are paid up to time of meeting. That being so, he may, if he should wish to do so, in consequence of what he may think of its prospects or otherwise, withdraw from the enterprise free from any further liability. The opposite of this is the new law of Limited Liability, with regard to which in the West I may state that the companies formed under it have not distinguished themselves by satisfactory results. This former system of portable lease has been successfully applied in Saxony and Germany, and indeed, it still exists in some parts of Saxony and Germany, and did so until lately in Derbyshire and Yorkshire, where, if any person found a vein he had a right to go on to the ground, and, by putting up a mark, he held the power of getting the mineral for 14½ yards on each side the mark, or for 29 yards, called a "meer," and including a few yards on each side of the line. Of course, there is a proper arrangement with the barometer of the district (from the German *bergmeister*, or master of the mine), by which the mine is compelled to recede and work within a certain time. A similar rule prevails abroad, where half-a-year is allowed to the finder of the lode to decide whether or not he will take it up. If the finder of the ore gets a sufficient quantity to "clear his meer"—that is, sufficient for the dues of the Crown—he is not accountable for damage done to the surface; but if not, he is, then, again, another custom is that of putting up a winze, which is not a real windlass, but a little one, like a toy (one of which the lecturer exhibited), to remove which was felony, the windlass representing, as it were, the rights of property. This custom, which did exist till (within half-a-century) in the West of Yorkshire and Derbyshire, also prevailed in the Forest of Dean. These laws arose when the practice of mining was simpler than in these days, and there is evidence of their existence in all mining countries. I have already mentioned Central Europe, and in Spain the system, though differing in some respects, is based on the same principle. An adventurer there obtains a "perpetuance," or a right to a piece of ground of a certain size only—300 metres by 200—for which he has to pay a certain amount of rent, and it would be his property as long as he would be able to employ a number of days in a year. If he could not do so, he believed the lode could be better attached to the surface, or, for any other reason it was desirable to do so, he could take a second piece on payment of as much more rent; but a great thing to be avoided was taking more ground, involving the payment of a heavier rent, than the produce would justify. In Cornwall the custom is called "bunding," and at one time was extremely prevalent, although now it is upon its last legs. At a time when the surface of the land was but little cultivated, it was useful to induce miners to go and settle there. It was very rare that any man made a discovery could keep it to himself for long, and he was obliged to make a discovery, and because of that it came to be legally recognised. The discoverer of a lode turned up a turf at each corner of the piece of ground he intended to work, and within those bounds he had the sole right of working. These rights were often divided and subdivided in a curious manner, and were handed down to sons and grandsons. Disputes arose, and trials at law followed, until it came to be ruled that unless the mine was kept constantly working the custom could not be upheld. Another peculiarity was that there was no limit to the amount that could be banded; and at the time of the discovery of the lode, the discoverer was allowed to take as much of the lode as he pleased, so as to include the whole of Dartmoor, comprising several hundred square miles. This led to attempts to get rid of the custom, and one of the first attacks upon it was the establishment of a rule that the bounds should not hold good if the owner did not go out and turn them once a year. These customs have almost entirely given way to a system of granting quantities of ground from one distinct point to another; but it is curious to see how our colonists adopted the earlier system. In California, where the precious metal was found in the division of the surface, the allotments were at first 12½ square, in which the holder dug a hole, and his neighbour on the other side of his boundary dug another hole. This was found to be a wasteful system; and so at Ballarat they found when it was necessary to descend to a greater depth that it paid better to work shafts at more distant intervals, and work underneath from one to the other. It was then discovered that the gold deposits followed the old stream courses, over which there were sometimes 300 ft. of debris; and this led to another modification of the system of taking diggings, and following the lead of the stream-course, in this way working men joined together, and after much labour and perseverance—perhaps for as long as one, two, or three years—were often rewarded by reaching deposits which afforded them large profits indeed.

LECTURE II.—Having in my last lecture simply led the way to an enquiry into the character of those accumulations of minerals the miner has to study and work for, and pointed out that after doing so every prudent adventurer would see to the conditions under which in different countries the right of mining was acquired—that being in the early days of mining the ceding of a small portion of ground to the miner, and in more modern times, in consequence of the greater capital employed and greater risks to be run, greatly increased the areas—it is necessary to give some idea of the proportion of gains demanded from the worker by the proprietor or lord of the soil for permission to work, which is called a "royalty." In ancient times, when the work was carried on near the surface of the ground, and with great facility, a great proportion of the mineral used to be taken, and frequently in a raw state for the use of the proprietor. This is still the practice in many eastern countries, where it often happens that the aversion of the proprietor acts as an indirect barrier to enterprise, and in some cases one-half or one-third of an mineral raised is so claimed. It is evident in cases of this kind that the relation between the proprietor and the miner is very like that of the giant and the dwarf in the old fable, in which the giant sent the dwarf to do all the fighting, and kept all the solid pudding for himself; just as in this case the proprietor undertakes the risk or expense, and puts himself to no trouble, but takes the larger share of the profits, leaving the miner to bear the expense and risk. In modern times, however, and in western countries, the royalty is very much diminished. The deeper the mine, and the greater the doubtfulness of the undertaking, the more will this be found to be the case. With regard to metallic minerals, it is usual for the lord to receive a certain proportion of the mineral in a dressed state ready to go to market, or of the money for which it is sold; and while in the North of England, where the old custom prevails, one-fifth is sometimes the amount of royalty; in most of the other districts it is one-seventh, one-tenth, or one-twelfth; in the districts the average "dib," or share of the lord, is one-fifteenth. In the deep mines of Cornwall, however, which require such a vast expenditure, and so large

an amount of machinery to unwater them, and so are worked at great depths, and with much uncertainty, the royalty varies from one-fifteenth to one-thirtieth. During the last two years, in which there has been so great a pressure on the mining interest (which, I am happy to think, is now lessening), the more liberal of the lords reduced the royalty for a time—that is to say, at pleasure—to a nominal amount, or declined to receive it at all until times should improve. I am glad to say that H.R.H. the Prince of Wales was one of those who led the way in thus relieving the miners from a heavy burden, to which they otherwise would have been subject. (Cheers.) If we take a glance across the Channel, we shall find that in the foremost mining countries in Europe there has been very considerable reductions of late in the taxes levied on mining enterprise. An adventurer there has the great advantage of knowing at once what he will have to pay to the lord of the land and to the Government. He has only to go to the proper authority, and state that he wishes to mine in a certain district, when arrangements are made which secure to him the right to work, so that no one could interfere with him as long as he paid the dues, which are fixed at a uniform rate. There are no cases there of complicated ownership, as there are here, compelling an adventurer very often to arrange with a great number of persons, some reasonable enough, but others often the reverse, before he can begin to work. It sometimes happens here that the owner of a single field may, by holding out for unreasonable terms, prejudice the prospects of the mine owners of a large area to such an extent as to prevent the working of mines in certain districts. By the method used in France and Prussia, and other continental mining countries, this cannot occur, as the Government over-rides all individual claims, and when a miner has once acquired the right it is his so long as he pays the proper dues to the Government, and the royalty is fixed at a uniform amount paid to the Government has been greatly reduced until now to 2 per cent. on the total quantity raised. In France it is levied on the actual profit made at a not much higher rate; while in Italy and Spain it is of so moderate an amount that no miner can complain. These are points with which it behoves the student to become acquainted before he can discuss the probability of success in any district. As regards coals and the other stratified deposits, the conditions under which they are placed are so various in respect to difference of quality, or the depth at which they are worked, or the facility or non-facility of sending it to good markets, that the royalty varies from 2d. to 2s. 6d. a ton. Before I turn to the various repositories where the useful minerals are so accumulated as to make it worth the while of the miner to bring his skill and capital to the task of removing them, I would point out a few books which will assist us; but in dealing with the matter I may say that there are no works on the subject taken at large, but on certain branches there are publications which will prove a most useful and important assistance. With regard to the stratified deposits, a great deal is to be found in geological works, because they refer to questions purely geological that the authors have found it necessary to dwell on those deposits with much minuteness. Among the works which thus deal in a general way with the stratified and other minerals, I may mention that of "Greenwell on the Mining of England," which will be found most useful with regard to coal mines. Another work is that by M. Combes, Professor of Mining at Paris; it is in three volumes, with plates, and is entitled "Traité de Exploitation des Mines." Another excellent work is by M. Burat, on the application of geology to mining—"Géologie Appliquée." For details, more especially relating to the geology of mineral veins, I would recommend some of the older books, amongst which may be mentioned "Pryce's Mineralogia Cornubiensis," although written a good many years ago is still applicable to the knowledge of lodes. To come to more recent times, we have the valuable "Reports upon the Geology of Cornwall, Devon, and West Somersetshire," by Sir Henry de la Beche, the founder of this institution, and by the same author another work, entitled "The Geological Observer," which contains a great deal of useful and practical information. With respect to the mineral veins, the "Mines of Cornwall," in four volumes, which are full of excellent drawings, and that of "Pryce on the Geology of Cornwall," by Mr. Pryce, on the Derbyshire, deserves notice. The volume of the Geological Society of Cornwall, by Mr. Henwood, is also a work of great value. Coming down more closely to the subject of mining, the work of Mr. Dunn, one of the Government Inspectors, on "The Winning and Working of Coals," and the practical treatise "On the Working and Ventilation of Coal Mines," by Mr. Hedley, another Government Inspector, may be advantageously studied.

Another excellent work for the students of mining is that of M. Penon, "On the Mines of France," in four volumes, which are full of excellent drawings, and I have myself written a little volume, which by an unwarrantable liberty on the part of the publisher is called a "Treatise." It was, however, originally intended to be one of Weale's Elementary Series, and was intended for a sketch of that description. A vast amount of information will also be found in those extremely valuable reports published from time to time by Her Majesty's Government, partly the result of enquiries by Committees of the Houses of Lords and Commons, and partly the returns of the Inspectors of Mines from all the divisions of Great Britain. That information, no doubt, is spread over too large an area of printed matter to expect students to wade through it, but it cannot be too strongly impressed upon those who are hereafter to have the management of coal mines that these reports are worthy of their continual study. I will now pass on to notice the stratified deposits in which useful minerals are found, and as some of my hearers have not yet gone through a course of geology, I must point out some of the principal bases belonging to that science which come into play in respect to our present subject. Thus the rocks which form the bed of the earth may for mining purposes be divided into two classes. In one division the rocks lie upon each other in a series of parallel layers, called strata, and when they are thus regular they are designated "conformable strata," and the two series are placed at different angles to each other, they are then called "unconformable strata." Upon the history of these strata I shall not enter at all, but simply notice a few points which seldom come under the notice of the ordinary geologist, but which are of the utmost importance to the miner. In the first place, I may mention that this sort of deposit goes under a great variety of names, according to different districts. Thus they are variously called sandstone, limestone, and gneiss. They have also been called by other appellations which are too strictly local to notice. The word "posts" is used when the minerals are extremely hard, and "girdles" when in sinking a pit the miners observe beds of a conspicuous colour, which are then supposed to encircle them like girdles. The parallelism to which I have referred is an important fact affecting the finding and working of many of the beds. If we see a number of these beds parallel to one another in one part of a district, and we go to another and find one of them, we may safely presume that all the rest follow in the same direction, and that we are in a line of continuation of the same beds. We may go a step further, and if we know that the coal of one district is overlaid with a bed (say) of yellow material, when we find that same yellow material in another district, we may presume (within certain limits) that there is coal beneath it there also. In this way the discovery of one rock has often led to that of others. When, however, we come to the unconformable strata, we may find that one group of rocks has nothing whatever to do with that beneath, but even in such cases the parallelism is of importance, as it gives us a clue to the position of the beds when they have been upheaved. These dislocations and upheavals place the beds at different angles to one another, which vary exceedingly. Thus, one bed may be at a small angle, the next at a greater, the next curved, and a fourth may be placed quite vertically. It is of great importance to be able to map or describe these varying positions accurately, and this may be done by observing the line of the outcrop, and how it runs with respect to the meridian, and then to note the greatest angle of inclination, which may then be described with reference to the points of the compass. In placing a proper instrument upon it you may get the general average of the dip. The inclination of a seam or lode is said to be "on the deep," and if upwards "on the land," or "rise." The next point to be observed refers to the upper and lower portions of these beds, and to their thickness. In determining the thickness of a seam or lode, care must be taken to measure it neither vertically or horizontally, which in most cases would greatly exaggerate it, and has probably led to many of the exaggerated statements often put before the public. The thickness of the seam or lode is measured by taking the bed at right angles, and to take the shortest line from side to side. The upper surfaces form the boundaries within which the miner works, and if they are within moderate limits they enable him to work them with the greatest degree of advantage, but no *a priori* proper thickness to secure that maximum advantage can be given. Beds of coal, for instance, vary from ½ inch to 100 feet in thickness, and the greater number of those worked vary from 2 to 8 feet. Of beds which exceed that thickness, the most remarkable is what is called the Tenby sandstone, in the neighbourhood of Tenby, which is not called, although its actual thickness varies from 25 to 35 feet. There is coal beneath it, but generally speaking it does not spread over a large area, like the famous Staffordshire bed. In the North of France the coal fields have a great number of thin seams, something like those in Somersetshire, but in the South of France there are remarkable seams of coal, 30 feet, 50 feet, and even 100 feet thick; that thickness, however, has not yet been proved to extend over an area anything like as large as the thick coal of England. In fact, these thick seams are almost always fragmentary, and occur in distorted ground. It is usual to call the upper part of the seam the roof, from the hanging side, and the lower part, which is in a metalliferous mine, and the underside the floor, or thill, or sole. When the seams of coal are thin they are most frequently divided from each other by intermediate beds of useless material. [A section of a shaft in the Forest of Dean exhibited the coal in many bands of various thickness, and the intermediate beds.] The effect of these variations is that while in one colliery a seam may be of a good working thickness, the very same seam half a mile off may be comparatively worthless, and another, which at the former place was thin and poor, might become useful. It is then, only within certain limits that we can feel any certainty of meeting with the same beds in the same condition of productiveness. [The lecturer then exhibited a variety of models, which showed a considerable number of different forms of stratification.]

We will next consider for a moment how far the beds are liable to interruption, and how far the miner may guard himself against disappointment and loss. It does not follow that because your neighbour has a good seam you will be sure to find that coal under similar circumstances. Coal seams are very apt to vary in a considerable area, and to become stony, to burn with difficulty, and then, perhaps, not burn at all. The reason is difficult to explain, but it is not unusual to find a sort of clayey stone mingling with the coal. It may still be carbonaceous, and there may be a great deal of carbonate of iron in it, so that it appears as if it were undergoing a process of change into ironstone. If a piece of this material be thrown into the fire it will be found that the ashes form a great deal of refuse, and its red colour will betray the presence of oxide of iron. In this way from a good material, rich enough to work, it becomes worthless, and it is impossible to say, *a priori*, how far the seam will extend. Again, there are cases in which a layer of sandstone as thin as a knife blade at first will gradually enlarge until it quite interferes with the working of the seam. Occasionally, if the seam be large, it may be so divided in this way that the upper and lower portions will have to be worked separately, becoming for all practical purposes two seams. In some districts it is not uncommon to come upon partings of sandstone 8 or 10 feet thick, in the midst of the seam of coal. There are other interruptions which I need scarcely mention, but you will see that such mishaps may easily be of an extent which would render a mine useless. It is necessary to be careful, therefore, if we would avoid the evil fate of those who take everything just as it appears before them. Beds of stone vary in the selfsame quarry, and it requires great care, therefore, not only in making a proper selection of stone for a given work, but to see that the quality is maintained. If this rule had been properly carried out great annoyance and disappointment would have been avoided in the case of the Palace of Westminster. The class of stone for this building was well selected, but the result proved that no individual stone can be depended upon, even when taken from the same bed, much less that the same goodness of quality will be continued along a great extent of country. In some districts faults and interruptions are so numerous as to interfere greatly with



the profitable working of some stratified deposits. [The lecturer then exhibited a number of drawings illustrative of various classes of disturbances, several of which he had sketched himself from actual observation on the spot.]

Another great difficulty arises from throws or heaves, as they are called. In these cases the series of beds appear as though they were cut in two, and the end where the severance takes place is either raised or depressed. Thus the miner may be following a seam or lode with great success, when all at once, without any warning, it suddenly disappears, and he comes upon the barren country. The question then is, what has become of the seam? It will generally be found on a close inspection that on the upper or lower side there will be what miners call "smut," that is a little powdered coal, as it were, indicating the direction they should go. If this dislocating plane is dipping towards them they know they will have to go up, and if it is slipping away from them they will have to go downwards to find the seam. If you ask to what extent these upheavals or depressions take place no answer can be given, as they vary from a few inches up to a hundred yards, and there are cases in Lancashire where 3000 feet is the amount of dislocation. The workmen seldom fail to find the seam again, but these dislocations put the miner to much needless labour and inconvenience. There are certain cases, however, in which this rule is incorrect, where the fault is reversed, as it were. A remarkable case of this kind has been found to exist at Bolton in Moors, a drawing of which (exhibited) had been sent by a former student. (Cheers.) Care must be taken not to mistake lamination for stratification. In many deposits, and particularly in those of slate, the plane of cleavage will sometimes be found to be at right angles with the natural stratification, a fact which up to the present moment has been a source of great ignorance. I will conclude by pointing out the enormous value these mineral repositories often prove to particular districts. Twenty years ago I was taking a holiday ramble with my friend, Prof. Percy, when we noticed at a furnace in the North of England a species of ironstone. No one at that time had any idea of its extreme abundance, but it became the cause of an enormous development of the trade of the district, and it is computed that, although it commenced only to be worked in 1848, 2,500,000 tons of that stone was raised last year. It employs nearly a hundred blast-furnaces, and some of the most gigantic fortunes in this country have been realised from this very ore of which specimens lay on the table. It proved to be a bed of great extent, from 6 ft. to 14 ft. in thickness, and excellent coke for smelting was within easy reach at Durham, from which circumstances the Cleveland district arose in that short space of time to be one of the most important mining districts of the world.

#### NORTH OF ENGLAND INSTITUTE OF MINING ENGINEERS.

The interest felt in the general meeting of this institution, held on Saturday, was much enhanced by the admirable inaugural address of the President (Mr. George Elliot), the Conservative candidate for North Durham. After lucidly tracing the history of the institution from its establishment in 1852 to the present time, he expressed the hope that many of the subjects which have been explored, but not exhausted, by the society would be treated again and again, and that other topics of equal importance will be deliberated upon. Foremost among these is the preservation of the lives and health of those working underground. Nothing can be more important or more interesting to us than this. The ventilation of our mines, the advantages and drawbacks attending the old, yet common, method of producing rarefaction by furnaces, as compared with the newer system of ventilation by the aid of machinery, is a subject claiming our earnest attention. The great depth at which many of our pits are worked, and the vast extent of their lateral ramifications, make it more than ever necessary that we should secure the best mode of rendering the supply of pure air certain, regular, and safe. It is maintained that ventilating by machinery insures these desiderata; that the nicety with which mechanical appliances may be regulated, the delicate adjustment of power of which they are capable, and the complete safety with which they may be worked, place them far before the system they are intended to supersede.

Referring to the probable duration of our coal supply, Mr. Elliot remarked that public attention has been properly called to this subject, and it was for them to consider how those may be beneficially worked, so as to insure their material wealth being made fully available. He had no hesitation in expressing his own opinion that the duration of our supply of coal depends in a great degree upon the scientific improvements we are able to make in our mode of ventilating the workings. It is probable that the ordinary means of ventilation, whether by furnace or fan, may be aided by a change in the force or agency employed for the purposes of haulage and other underground work. As an instance of his meaning, he might mention that the apparatus which he had introduced in South Wales, and which, by means of compressed air used as a motive power instead of steam, draws trams and pumps water with complete success, is found to generate ice in an atmosphere which is naturally hot and oppressive. The mechanical usefulness of these new air-engines seems capable of indefinite extension; while, as their cooling properties form a collateral advantage arising out of their use, it is at least possible that they may prove valuable auxiliaries to the more regular means of ventilation in extending the security and promoting the duration of our coal supply. The difficulties of ventilation once surmounted, the extent of coal at our disposal is incalculably increased. The fields to be worked below the sea on our east and west coasts, especially in the counties of Durham, Northumberland, and Cumberland, are in themselves enormous, and will be for all practical purposes as entirely within the reach of the mining engineer as the ordinary workings out of which coal is hewn.

Geology indicates that in many districts the coal strata extend seaward 10 or 12 miles beyond the shore; and it was his firm belief that by sinking ventilating shafts in the German Ocean, the coal below it may be worked as safely and as profitably as it is beneath where he was standing. Nor did he recognise any difficulty in the transport of such coal. According to his estimates, it would neither be more costly nor more laborious than it has been in days gone by to convey coal the same distance, after it was brought to the surface, inland. Of the minerals obtainable in Durham alone, one-third may be held to lie under the sea, and that all coal fields having a similar inclination of strata, and bordering on the ocean, will be similarly enlarged. This at once disposed of some of the fears expressed as to the duration of the supply, and which he was quite aware that these theories as to ocean shafts and working under the sea may be challenged, they were not put forward without due deliberation, and he was content to stake his professional reputation on their practicability. Nor did he think that the views entertained as to the rapid exhaustion of our inland coal fields should be hastily accepted as correct. No approximate estimate can be formed as to the extent of coal yet unworked. That lying under the Permian and New Red Sandstone has been comparatively untouched; and according to his estimate, but a very small percentage of our coal has been brought to the surface during the hundred years we have been at work. In some districts, notably in South Wales, scarcely more than 1 per cent. has been moved. If, therefore, we add the coal under the bed of the ocean to that already at our disposal by known means, we find a supply which is more than sufficient to allay the alarming fears which have been expressed. It is unnecessary to dwell upon the national importance of this fact. The power, the wealth, the happiness of England are so intimately connected with the proper working and adequate supply of a material so much of her present prosperity and pre-eminence are due, that to pronounce upon the long continuance of the supply is to open out new vistas of commerce, of enterprise, and of invention.

Turning from the subject of coal itself, Mr. Elliot passed to the systems under which it is obtained; he spoke with regret of the modes still adopted by the majority of his fellow-workers in the North of England. Few men had better right to think highly and to speak well of the pitmen of this country. He knew their wants, their trials, their temptations, and their sufferings for the best of reasons he had tasted and understood them. Born in the midst of this great population of miners, and ascending and descending with them from his earliest days, he was fully cognisant of the sterling qualities by which they were distinguished, and that their industry, self-reliance, courage, and skill were beyond praise. He would entrust to them duties the most difficult and the most arduous, confident that what men could do they would do, and that in no other section of society would he meet more thorough, more conscientious, and more resolute work. But in dealing with this branch of his subject he was compelled to judge by results, and it was in his experience that the best means of working coal are not yet generally adopted in the North, the percentage of small coal is larger here than in almost any other district; the amount of large coal is not so great as might fairly be looked for from the quality of the material and the experience of our mining engineers. Furnishing, as we do, many of the leading men for all parts of the world in which coal is worked, it was to him a matter of grave regret that we have not yet accomplished the rudimentary art of adopting and holding fast by the most perfect method of working our own material. Elsewhere the long wall, the double stall, and several other systems have been tried with advantage; here we have, with few exceptions, been content to run on in the old groove, and the result is that we have far greater waste than is at all necessary. He was the last man to advocate the running after things that are not really for the sake of their novelty; but when statistics and analogy prove that other modes of working are attended with more practical advantages than our own, it behooves us to look closely into our daily practice, and to have the courage and energy to adopt improvements, lest our fame should be tarnished, and our laurels withered, merely because we have stood still while the world around us has advanced. But this is a subject which he trusted would be discussed by the members of the institution. No more valuable addition to the Transactions could be made than carefully-digested facts argued out by experienced men, the conclusions from which should enlighten us as to the comparative merits of the various modes of working our coal. Fully aware of the difficulties attending any great change of system, he was, nevertheless, satisfied that those difficulties could be surmounted.

His next proposition was of the utmost importance, for it aims at revolutionising the system under which coal is worked. It is simply that we should abolish the use of gunpowder in our mines, and by so doing reduce the number of deaths from colliery explosions to a minimum. For more than a quarter of a century he had steadily looked forward to this end, and upon all favourable occasions agitated the subject among his engineering friends, had tried divers experiments, and had watched and tested with nearest interest inventions which had the disease of gunpowder for their aim. Nearly 20 years ago, while giving evidence before Lord Wharfedale's Committee, in the House of Lords, he had the honour of suggesting that the Government should offer a premium to anyone who succeeded in making such discovery. It should never be forgotten that the existing necessity for the use of gunpowder is the fruitful source of colliery accidents; once abolish it, and the need for naked lights is gone. Safety-lamps might be devised which the pitmen could not open, and the grave disasters, which it is one of the first duties of this institution to guard against would be diminished to an extent which it is impossible to look for now. Until this change is brought about we cannot hope for any material diminution in risk. At present the phrase "safety-lamp" is a misnomer. No lamps yet invented are entirely safe. A series of experiments, tried by the late Mr. Nicholas Wood and himself, several years ago at the Killingworth Colliery, showed that at a certain velocity the flame passed all the lamps in existence, and until it is possible to send our men into the pits with enclosed lights and cases which are immovable we shall not have grappled with the difficulties arising out of fire-damp and gas. He well knew the substitution of mechanical means for blasting by gunpowder to be fraught with difficulty, for years ago he and the late Mr. H. L. Pattinson held frequent and anxious conferences on the subject. The experiments they then made were not successful. They endeavoured to burst down the coal with quick lime and other substances, but failed in every instance, owing to the slowness of the operation. He had tried, moreover, to force down the coal by hydraulic machinery, but failed also, through the water percolating

into the coal, and exhausting itself by that means. He had, however, the satisfaction of knowing that their labours have not been altogether lost, for their results having been sedulously made known among his younger engineering friends they, in their turn, had brought their energies to bear upon the point, and with considerable success. He had recently seen three kinds of appliances for this purpose, some of which are being worked at this moment in his collieries in South Wales, and, according to the latest reports, working well. His conviction is, therefore, that mechanical means will very soon make the use of gunpowder unnecessary; that lights which it is possible to explode will in consequence be banished from our pits, that our coal will be produced in a far better condition, as well as at comparatively little risk to human life, and that one great object of his professional career will be attained.

With regard to the comparative prevalence of fire-damp in seams, Mr. Elliot gave some most interesting information concerning the zone of maximum danger. It seems that, as a general rule, pits of less depth than from 60 to 80 fms. are almost free from gas; that at from 80 to 180 fathoms deep, gas is most dangerously prevalent; and that, after the last limit has been passed, the workings down even to 300 fathoms, again become comparatively pure. A feasible reason for this singular gradation is that in the zone first named the gas has a natural vent at the mouth of the pit, and by means of the various strata through which it can filter to the surface. At the middle zone, or point of greatest danger, the gas has not the same means of clearing itself, while that generated there is augmented by the gas ascending from the greater depths, and the aggregate amount stagnates, to the increased peril of those working in it. Another reason is, that gas goes to the lower parts of the mine, and is consequently in the lower part of the additional weight of the superincumbent strata—a principle to which he would presently refer. The heightened temperature causes it to expand and ascend, and so find its way to the middle distance, which becomes surcharged, through the vents not carrying it off with sufficient rapidity. And in his experience he had found that in this zone (80 to 180 fathoms) a sudden fall in the barometer produces a greater increase of gas than in either of the others; another proof how much more it is charged. In corroboration of this he referred to a paper read before the Institution in 1856, "On the Effects produced by Working Seams of Coal Above or Under each other"—the effect, as subsequent knowledge has taught, being almost the same. What he then stated has since been abundantly confirmed. In the zone nearest the surface the working of seams one above the other has not the same effect as in the other two. But by working seam over or under seam at the middle distance, and at the greatest depths of all, a wonderful improvement takes place in the condition of the coal. The lateral workings provide the gas the same opportunity of escaping as at the least dangerous depth. It finds its way through the strata from the opening out of the seams above and below, just as it does to the surface in the first zone. The result is that coal, when it is first reached, is soft and crumbly, becomes hard and firm, and workings which were originally surcharged with gas, are made purer and more safe, as the seams above and below them are displaced. At Monkwearmouth, Usworth, and other deep pits, the general improvement from this cause has been very marked. We here see that the principle on which many of our colliery leases are granted is erroneous. These contain stipulations that all upper seams shall be worked first. But the leases, designed as they are to preserve the coal and avoid loss, defeat the object in view. To work seam under seam and over seam concurrently is advantageous both to lessor and lessee; it ensures a purer atmosphere underground, and a better condition of coal, and, therefore, merits the advocacy of all interested in our coal fields, and the extent of their supply. And here let us distinguish between knowledge and hypothesis. The increased freedom from gas at the distances cited, and under the circumstances detailed, is a fact beyond dispute. But the reasons leading up to this state of things are put forth as a theory only, but as a theory based upon experience of the deepest workings in the kingdom, in all of which the state of the atmosphere at the different depths had been as he had described.

A new theory concerning the increase of temperature at great depths are attained was likewise enunciated. The oldest belief is that this is caused by a vast volume of internal fire at the earth's centre, which as it is approached naturally causes the heat to become more intense. Another view, and one widely entertained, is that the pressure of the atmosphere produces the heat experienced, and that the greater the column of air the warmer it will be below. These are the two leading theories at present, but he thought to him they both appeared to be incorrect. They had been conclusively disposed of by some observations taken at his request at Monkwearmouth, 1600 feet below the level of the sea, and in South Wales, where the coal is on a level with the sea, but where the workings are under a mountain 1600 feet above it. Of course, if internal heat were the solution, the first place would be hotter than the last, though being so much nearer the earth's centre. Again, if atmospheric pressure accounted for increased heat, the Monkwearmouth pit would have a proportionally higher temperature, for as the gas goes to the lower parts of the mine, it is at 1600 feet less atmospheric pressure than the one first named. Instead of this, however, the thermometer shows precisely the same temperature at each pit; and, as he thought, the plain inference is, that the heat of our mines depends solely upon the weight of the superincumbent strata, and not upon either central heat or the pressure of the atmosphere. The depth below the level of the sea, and the height of the mountain, put both places on equality in point of temperature. And, carrying the argument a point further, it will be seen that by abolishing the weight of the central heat, the inland coal workings in England would have somewhat new light. If the amount of superincumbent strata be the true cause of subterranean heat, it follows that whenever we sink for coal the height above the level of the sea we are likely to reach will have to be taken into consideration when estimating the probable temperature of deep workings. If, for example, we had to sink a pit as deep as Monkwearmouth, at a point from which the coal seams run under mountains as high as those in South Wales the heat would become increased in the ratio of the distance from the summit of the high ground to the level of the sea, and the temperature would be correspondingly increased. The sinking takes place nearly at the sea level. For if we take the sea level as our starting point, all deep workings will be found to increase in heat in proportion to their distance above it at the surface; an important consideration for those interested in sinking pits from high ground. This opens out a new field of enquiry, and seemed to favour his views as to the practicability of working extensively under the sea. But it is only right to add that the course of experiments from which this general law is deduced had acquainted him with exceptions, and that the question of central heat has not been so high under a mountain as he would lead one to expect. But in all such cases he had had reason to believe that the apparent discrepancy between theory and fact could be accounted for by the exudation of highly-compressed gas from strata. This was sensibly cooler to the touch, just as is the air which escapes from the high-pressure pneumatic engines to which he had just referred. We thus see that some of our inland coal fields are at a positive disadvantage with those lying untouched beneath the sea.

But the last portion of the address is that which will exercise the greatest influence upon the future of the society—it is a proposition to form the principal associations which have from time to time been formed on the model of the North of England Institute of Mining Engineers into one great confederacy, with a view to facilitate the diffusion of professional knowledge amongst them. His proposition was that they should endeavour to amalgamate with the other mining institutions of the country, so as to ensure a more general recognition of the importance and usefulness of their calling. By putting themselves in official communication with the authorities of the Government School of Mines and the great associations of South Wales, and elsewhere, they might evolve a national scheme, which, while preserving to each community that corporate individuality which is so valuable, would enable mining engineering to take high rank as a scientific profession, and its members to be more widely understood and appreciated than is the case now. As the oldest and largest institute of the kind, it would not be thought unbecoming in them to take the initiative, and by inviting their brethren in other districts to discuss the matter on equal terms they would, he was satisfied, and in working together, the advantages of all the different districts would be brought forward, and they would be able to stand shoulder to shoulder for the common good; and there should be no difficulty in cementing a professional alliance which would ensure considerable benefit to those joining in it. With this view he had recently been in communication with the Senate of the Durham University, and the leading members of the Institution of Civil Engineers, in London. It was his hope and belief that this institution, and through it the profession generally, may be greatly benefited by the facilities so obtained from both those distinguished bodies. The authorities of Durham University are laudably anxious to fulfil the great purposes for which it was originated, and their efforts to promote the cause of scientific education merit the warmest thanks of the mining engineer. The additions now made to its classes, and to the subjects taught, are strong evidences of a renewed youth, and will cause that foundation to render the same invaluable services to the students of the present day which it has been the glory of our venerable colleges to bestow upon those of the past. At a time when the importance of technical education is generally admitted, when, as the interesting report of our own Technical Education Committee has just shown, they were agreed to co-operate with the Coal Trade Association in making the advantages offered by the Science and Art Department available for this district, and when the munificence of private enterprise in making endowments on behalf of technical education has received the approval and co-operation of the Ministers of the Crown, there is something peculiarly gratifying in the fact that so valuable a college as that of Durham should express its willingness to promote the objects of this institution, and by placing a portion of its prizes within the reach of their profession, provide an admirable reward for, and supply a valuable stimulant to, the industry of their youth. The provisions made by the University for education in mining seemed to him to be of an extremely liberal kind. The student who presents testimonials of good conduct, and certificates that he has been engaged in practical work connected with mining for a period of not less than two years, may matriculate after keeping three terms of residence in the University—that is, he may pursue practical work either as a selected pupil or a colliery viewer, and may then go up, and by studying steadily for eight months, fit himself for public examination, and to compete for the prizes offered by the University. It is impossible to exaggerate the importance of this concession to the hard-working, capable mining engineer, whose experience has hitherto been of a practical rather than a scholastic kind. In no calling in the world is the lack of scientific education more severely felt. Without it, the most complete practical knowledge falls short of its aim; with it, no position is shut out from the intelligent and industrious aspirant. With ordinary preparation, these eight months' study at the Durham University would fit most of our clever and intelligent young men for the most responsible amount of mere pit-knowledge would entitle them to look for, for there is in the mining engineer's calling a certain border line, or debatable land, which the uneducated or the defectively educated have enormous difficulty in passing. The qualities without which no mining engineer is fit for the trusts imposed upon him must be supplemented by scientific acquirement before he can hope for the first rank in his profession. He had in his life known admirable men kept back through the want of the very knowledge which the facilities he then proclaimed would have placed within their grasp; and as a twelvemonth's study may now be aspired to by any intelligent pit worker—from pony lands upwards—who chooses to display energy, and exercise self-denial, he hoped to see the time when this term of University study would be regarded as a necessary addition to the years passed below ground, or in the mastery of plans and workings. With the advantages open to them in the present day, it was surely not too much to hope that this association may join with its neighbours and assume a national title and character. The time is long passed for our objects and aims to be even nominally limited to a province or to a district. The United Kingdom itself need not represent the limits from which the mining engineer may select, or the interests to which he is to look. He submitted, therefore, for their consideration that they should look forward to the title of their institute taking a national rather than a provincial form; and that when the words "Great Britain and Ireland" have been substituted for "North of England" in their papers and

documents, a corporate connection with the Institution of Civil Engineers should be looked for; that the scholastic advantages offered to them by the Senate of the University of Durham should be secured; and that they should thus follow to their legitimate conclusions the principles they were united together to uphold, and the aims it was their first duty to promote.

**INSTITUTION OF CIVIL ENGINEERS.**—This Association will commence its fifty-second session on the evening of Tuesday, the 17th instant, when a paper "On Lighthouse Apparatus and Lanterns," by Mr. David M. Henderson, Assoc. Inst. C.E., is to be read. During the recess the premises in Great George-street have been rebuilt and greatly enlarged, the meeting room alone being twice the size of the former one, and capable of accommodating nearly 400.

**SOCIETY OF ENGINEERS.**—On Monday evening there will be a discussion on the paper "On Modern Gas-works at Home and Abroad," read on Nov. 2, by Mr. Henry Gore.

#### Original Correspondence.

##### THE WEATHER, AND COLLIERY EXPLOSIONS.

**SIR,**—In last week's *Mining Journal* a letter appeared from Mr. T. L. Plant, of Birmingham, pointing out that twelve months ago he had warned Inspectors of collieries and others as to atmospheric influence. With all due respect for that gentleman, I must beg permission to say that earlier than the period of time he mentions—that is to say, on March 1, 1867—I stated in my report to the Right Hon. the Secretary of State all that was then necessary as regards atmospheric and cosmical conditions. Moreover, when the period again came round for communicating the usual annual records of my district, I went into the matter at still greater length in my report of Feb. 29, of the present year.

The oscillations of barometrical pressure and of temperature have been known to mining engineers for a great length of time, and I have no doubt but that the due study and consideration of those phenomena have during the last twenty years enabled viewers and Inspectors of Mines to take such steps as have been the means of saving very many valuable lives in our most fiery collieries.

Clifton, Nov. 9.

LIONEL BROUGH.

##### THE COAL SUPPLY, AND THE GOVERNMENT INSPECTION OF SOUTH STAFFORDSHIRE.

**SIR,**—Under the signature of "Observer," some friend of the Mines Inspector for this colliery district has written you a letter, as a reply to mine of the previous week, and to the one which called it forth, that you printed on Oct. 10. As to the one last mentioned, I have no doubt that its author could, if he should think fit, defend his epistle from the charge of being "a long series of vague statements." It was because that letter seemed to me to be the very opposite of vague statements, that it afforded me gratification, and was induced to back it up by your courtesy in the letter of Oct. 24. The facts stated were not vague: they were simple recitals of what is being done here, showing that there is much vitality in the district, arising out of the extent to which coal, at one time thought to be useless, is now being profitably and extensively worked. Those facts I regard as little short of a complete reply to Mr. Baker's assertion that "within a few years" the present rate of out-put will "completely exhaust the supply, so far as the coal can be wrought for the purposes of iron manufacture." The letter of October 10 shows that such a phrase as "within a few years" is altogether inaccurate, as applied to the period at which the coal of this district will avail us for making iron. This I too maintain; and because the contrary was asserted by a Government officer, having the charge of the district, I, as one deeply concerned in its prosperity, complain very earnestly. It is true that that Government officer explains that "there will, however, still be thin seams of coal left, suitable for domestic use;" but in making the explanation he shows that he is unaware of the extent to which these same "thin seams of coal" are being worked and used "for the purposes of iron manufacture" in South Staffordshire. That they are being used in a large and increasing degree will be remembered by those who read the letter of the Coal and Ironmaster (that of October 10), who first drew attention to Mr. Baker's alarmist statement.

Such an assertion as Mr. Baker has ventured upon, and which was repeated in the Supplement to the Journal of Oct. 31, are extremely prejudicial to the commercial interests of South Staffordshire, unaccompanied, as they are, by any statement of the increased and increasing knowledge we possess of the means of utilising fuel before thought worthless, and unattended by any hint as to the probability of these existing sources of supply yet untapped, which there are few of us here who do not believe to exist. In my former letter I complained of the baldness and the crudity of the statement, and ventured to point to one of the many ways in which, in the matter of our future supply, Mr. Baker might have served this district in his official capacity, instead of continuing to do that which, from the pertinacity of the effort, one would think that he is solely paid for. Upon this "Observer" says that Mr. Baker knows his place and duty far too well, and has what we can only describe as too abject a deference for that awful something which he denominates the "executive," ever to think of making any useful suggestions, and that it is quite out of his line to propose that the Government should be requested to make some trials to find coal under the Permians, so that we might have some little official comfort about the future of our district. Can there be a keener satire upon the genus "Government official" than is here unfolded as to the views of the Inspector in regard to his duty? Mr. Baker would have us believe that his sense of duty is so severe that he would rather see the whole of South Staffordshire "go to the dogs" than risk a snubbing from the executive, by being deemed a little too forward in making a suggestion to them with a view to the saving it from that calamity. This is red-tape twaddle with a vengeance.

The real truth of this coal supply question is stated in a communication upon the "Iron and Coal Trades," which appears in the *Wolverhampton Chronicle* of to-day, from which I have copied the following:

"The question of the duration of the coal supply of South Staffordshire is one that is now causing a good deal of attention here, in consequence of the alarmist views of some parties, who speak with authority on such a subject. On one side it is asserted that in a comparatively short time the vast thick coal deposits of South Staffordshire will be practically exhausted, and its mineral position very much deteriorated. On the other, various arguments are adduced to show that there are ample stores of fuel yet untapped, and that a great development will yet take place in several directions. The alarm and views about the decline of South Staffordshire have been heard so often that people have got to take very little notice of them. There is plenty of vitality about the district yet, if matters are only well managed; but, of course, we cannot have the cake and eat it, and the great treasures which the district once possessed must now be to some extent wearing away. Like most other matters, in this case the truth, probably, lies midway between the two extremes. There is sufficient reason for the greatest economy to be exercised in using the coal we have left, but no immediate fears need be entertained that we shall suffer much inconvenience at present from a scarcity of coal."

As to the same subject, and in respect of what we are doing here to make the best of what we possess, let me add this extract from a report in the same newspaper of a communication respecting South Staffordshire, read at the Social Science meeting, in Birmingham:—

"In the year 1865 the Inspector of Mines for this district reported 340 collieries in operation, yielding 10,200,000 tons of coal, and employing 26,820 persons. The unexampled commercial prostration which has prevailed since that time has prevented much recent progress in the development of the district. Some attention has, however, been, and is still being, practically given to the economic working of the mines, combined with increased safety and comfort of the miners, and antiquated methods of extraction, by which a large amount of fuel was irretrievably lost to the nation, are gradually being superseded by a more enlightened policy, dictated rather by the teachings of science than by the prejudice of ancient custom. Mr. Hall estimates the original quantity of coal in South Staffordshire to have been 3,972,000,000 tons, of which about 970,000,000 tons is still ungot. At the present rate of working the coal within the present acknowledged boundary the coal field will be exhausted in about 100 years."

Mr. Baker seems to attach more significance to my dissent from his rough-handed style of dealing with certain other subjects embraced in his report than he does to the question, which I regard as of paramount interest. Upon this I will say very little; but, if you will allow me, what I do say shall be pointed, and I will venture to assert that it will express the sentiments of 90 out of every 100 of the coalmasters and mine agents of the district in which Mr. Baker is the Government representative. "Observer" thinks it very extraordinary that while Mr. Brough expressed a strong opinion adverse to the butty system he should, nevertheless, have had a dinner and a claret jug given him on his retiring from the district. But this fact presents no ground for surprise, for Mr. Brough always wrote, spoke, and acted as a gentleman, nor was he forever revolving in his mind schemes to increase the severity of "pains and penal-



No. 7.—In presenting you with our four-monthly report for the general meeting to be held on the 10th instant, we beg to point out our present mode of working, and the future prospects. The 170, on Vivian's lode, is now exposed west of main cross-course to within 60 fms. of Hallett's cross-course, and the latter in the 70, 80, and 92, large quantities of copper ore have been raised; nothing has been done on this lode below the 92, before this end (170), at the section will show; thus showing a piece of unexplored ground for nearly 80 fms. in height, and all in whole to the boundary. Although the lode in the present and the rest of the region containing occasional stones of ore, but not sufficient to value, and the regularity of the vein, and the smallness of the pieces of ore, and is found as productive as in the upper levels it will open up a piece of profitable ore ground, which would last for many years. In the 170, east of cross-cut, on Allen's lode, we are within 18 fms. of the boundary; within 14 ft. of the extreme end and we unexpectedly intersected what we consider a split from the main cross-course, which will no doubt prove to be very important for us; we have suspended the driving of the end, and placed the men to drive north on the same, and, so far as we can see by the plans, the lode must be standing in this direction, where they have a good lode of ore left off in South Cardon close to the boundary. The length of the cross-cut, out of which nearly 7 fms. have been already driven, and the ground still continues moderately easy for progress. Dunstan's lode, in the 104, east of cross-course, is extended 37 fms. The wize sinking below the 92 has been sunk 7½ fms. below the 114 (Gonamena), which is about equal depth with the 104, named above. At the bottom of this wize we have driven west about 7 fms.; and these two points we are pushing on by ten men with all possible speed, where we have to drive about 7 fms., and hope to effect a speedy communication, and when accomplished we shall then be in a position to work away some ore ground which we have sunk through, and as well some back, which we have been left off by the hanging of the 92. The south side of the cross-cut bore of the 92, of Marlina's shaft about 23 fms., and, as we stated in our last general report, the shaft passed through an elvan, which entirely split up the lode; in driving south 5 fms. we intersected a lode, and driven east about 4½ fms. in driving north we had two patches of elvan, each 2½ fms. wide, and about midway in the same we had a patch of granite 7½ fms. wide; in this we intersected a lode, and opened out west 3 fms.; although the lodes are small by the influence of the elvan course, they produced some very rich black ore; we are still forcing on this cross-cut north with a view of cutting across the lode, which we cannot bear distant; after this cut is driven, the lode will be the line of the shaft to be resumed, and the north part of Gilpin's lodes for upwards of 80 fms. in length, we have put a pair of men to drive on the latter at the 17, where we have from the present end 38 fms. to reach the little cross-course; when this is reached Taylor's lode can be intersected, and both opened out at the same time if thought advisable. Although the ends at the present left off are not rich, we consider this piece of ground should be further explored, seeing that other parallel lodes have been found so profitably productive. We have pointed out the driving of the ore pursuing, and would still recommend the continuation of the driving of the 170 west on Vivian's lode, seeing this piece of ground standing all in whole for



a considerable length and height, and as well the 170 cross-cut, north of Allen's lode, where we are fast approaching the lode towards where they have a good course of ore in South Caradon; this we are watching with intense interest, and if found so productive as they have it, would quickly place this mine in a good position; and also when the 104, on Dunstan's lode, is holed to the winze sunk below the 114, we shall then have a good advantage in taking away the ore ground where holed to Gomena. At Marina's shaft we are cross-cutting at the 30 in this piece of whole ground, where we have several lodes for upwards of 200 fathoms in length, which can be proved effectually by this shaft; and if found productive it will open up an entire new mine. In conclusion, we do not hesitate to say that there are but few mining speculations that hold out greater inducements than this for ultimate success. We have employed on the mine 137 hands.—WILLIAM JOHNS, NICHOLAS RICHARDS.

The CHAIRMAN moved that the report be received and entered on the minutes, and that the accounts be passed and allowed. He regretted that the committee again came before the shareholders with such a heavy debit balance; and if the deep levels were to be prosecuted he did not see that there could be any serious mitigation in the costs. A large sum of money had been expended in sinking Elliott's shaft to the 180 fm. level, from which nothing had as yet been realised. He must confess his own opinion was decidedly in favour of working the shallow in preference to the deeper lode. It was true that some important result might be realised from the deeper workings, but at present the lodes could not be valued at those points. It was, of course, for the meeting to consider and determine what course should be adopted. After some further discussion, the report was ordered to be entered on the minutes, and the accounts were passed and allowed.

A call of 2l. per share was made. The committee of management were re-elected. A vote of thanks to the Chairman terminated the proceedings.

#### NORTH WHEEL CHIVERTON MINING COMPANY.

A general meeting of shareholders was held at the offices, Gresham House, on Thursday.—Mr. GEORGE NOAKES, F.G.S., in the chair.

Mr. PARRY read the notice convening the meeting, and the minutes of the last were approved.

A statement of accounts was submitted, which showed a credit balance of 50l., including the cost for the month of October.

The report of the committee was read, as follows:—

The committee are desirous to lay before the shareholders the operations that have been carried out during the 18 months the company has been established, in order that they may fairly judge of the present position of the mine and the prospects for future working. Nearly 250 fms. of ground have been excavated in sinking and driving, and the mine laid open to the depth at which it was expected profitable ground would be found. The committee regret to state that this expectation has not been realised. The engine-shaft has been sunk from the 60 to the 105, at which point the lode was intersected at the shaft; and, although improved in character—strong toothy quartz, with occasional large cubes of lead—there is yet no concentration of mineral to value. In the 90 fm. level, driving east, an improvement has taken place in the end approaching the point under which a fine bunch of lead was found going down in the bottom of the 80. This is the most promising end in the mine; and, should the lead in the 80 hold down to the 90 and to the 100, a profitable piece of ground may yet be opened out; it is, therefore, desirable to continue this end. The committee desire also, on account of the improved character of the lode in the shaft, to sink 12 fms. below the 100, for the purpose of proving the lode at that depth. Throughout all these workings the lode has been uniformly large and congenial, but of no mineral value. A great sameness has prevailed. No cross-courses or other disturbing influences have been met with, such as generally give a mineral character to the lode. The committee have, therefore, directed their attention to Hicks's shaft, 200 fms. west of the present working, where an elvan course and a cross lode of a strong productive character can be seen running in the shaft for the last 4 fms. in the area, 17 fms. from surface; this lode has been inspected by Mr. Clemes, and other eminent mine authorities, and they are all of opinion that this part of the shaft offers every encouragement for development, and they strongly recommend the committee to work it. The committee, participating in the general opinion, have commenced to sink a shaft at Hicks's from surface, to take the lode at the 40, and they recommend the shareholders to support the committee in a vigorous development of this western part of the shaft. In conclusion, the committee would beg to observe that all the operations of the mine have been carried out within the time and within the cost estimated; and, while they deeply regret that the success anticipated has not yet been attained, they nevertheless feel themselves justified, as holders of a very large interest in the undertaking, to recommend further outlay, for the purpose of sinking a shaft at Hicks's, and to prosecute a larger development of the mine. The committee are the more desirous to carry out this development, since the great discovery has been made at Wheel Chiverton, on a north and south lode, running in the same direction as that at Hicks's shaft, and which strengthens their hopes of success. It is calculated that 20s. per share will be sufficient to provide means to sink Hicks's shaft, and prove the lode in the 40, as well as to continue such operations as may be deemed advisable in the eastern mine; and the committee have strong hope that by a vigorous development of the western ground the capital expended may be returned with profit.

The report of the agents was read, as follows:—

Nov. 11.—We beg to present you with the following report of this mine for your general meeting, to be held to-morrow, showing the amount of work that has been accomplished in the past quarter, together with its future prospects. Since your last meeting the pitwork has been drawn up from the old sump-shaft, flat-rods suspended, and the pitwork arranged in the engine-shaft from the 43 to the 100 fm. level, which has now put us in good working order in this department. The shaft is sunk 5 fms. 3 ft., and is now 7 fms. 1 ft. below the 100; the lode has been in the shaft for the last 4 fms., the leading part being about 7 ft. wide, composed of quartz, spar, muddle, with occasional good stones and strong spots of lead, with a beautiful country about it. The 100 fm. level has been extended east on the south part of the lode about 14 fms., at times producing good stones of lead; from the appearance of the lode in this end, and the character of the lode gone down in the level above (the 90), we are of opinion this end will improve as we advance. We may here remark that about midway of this drive we cut through the lode, and found it to be about 15 ft. wide, chiefly quartz, spar, muddle, with occasional good stones of lead, and a few small pieces of lead. The 90 fm. level has been extended east 11 fms. 3 ft., and is now about 35 fms. from the shaft; the last 13 fms. driven through has produced from 1 to 2 tons of blende per fm., and at times excellent stones of lead, especially towards the bottom of the level; the lode in the end is large, 5 ft. of it saving work for blende and lead. We are putting up a rise in the back of this level, near the end against the winze, which is down 2 fms. below the 80; this rise is going up on the north part of the lode, being the most favourable for speed; now up 7 fms. We hope to effect the communication in a few days, which will uncover the 80 fathom level, and give good ventilation for driving this end (the 90), which will be pushed on with all speed, for reasons before stated. We have just commenced a winze in the bottom of this level, about 13 fms. behind the end, and about the same distance in advance of the 100; down 6 ft., but we fear the water is too quick to do much until further drained; the lode is producing good saving work for lead and blende. We recommend the present operations to be continued in this part of the mine, as we are still of opinion a productive lode will yet be met with in this part of the mine, and the progress is satisfactory.—Down 4 fms., and secured. Particulars of this part of the shaft we gave you in our report for last meeting. Since then there has been a good discovery made in Wheel Chiverton Mine, on a north and south lode, or cross-course, which cannot be spoken too highly of; and as there are known to be cross-courses traversing this part of the shaft in connection with the east and west lodes, one of which can be seen in the adit shaft, and produces good stones of lead at only 10 fms. below surface, we therefore consider our prospects in this part are still further enhanced.—W. HANCOCK, W. T. BRYANT.

The CHAIRMAN said the tenor of those reports was not altogether so satisfactory as it had been hoped would have been the case at the present time, but he need hardly say that all who associated themselves with adventures of this kind must be prepared for the vicissitudes inseparable from mining. It was not, however, because they had been hitherto unsuccessful that this success was out of the question, for the lode was exceedingly large, although as yet not concentrated enough for the production of minerals. His old friend, Mr. John Peterick, who inspected the mine for a former company, then stated that unless some change took place in the ground below the 80 he should not have much hope of the mine, but when some change did take place he had a better opinion; and when some stuff brought up from the 100 was shown to him, he said "There must be a deposit somewhere." Mr. Clemes, whom he (the Chairman) looked upon as one of the best mining authorities of the present day, also said, after having inspected the mine, that "There must be a deposit somewhere," and their own mind had always said "There must be a deposit somewhere." It was the same words coming from these three mining authorities, and it was the same words coming from the Chairman, and it was not to be gotten that mines had been often worked for years, until the shareholders were disappointed, when all at once that which they had hoped to find at an earlier date was at length discovered. He felt that as far as the shareholders in this company were concerned, it would be cowardly now that the subscribed capital had been pretty well expended to leave the mine without further trial; and more than that, they would be all dreadfully annoyed if others were to step in and reap the benefit of the capital expended. He felt he could thus address his co-shareholders, because he himself held 250 shares, which was no mean interest in a concern of that kind, and he might add that he was quite willing to expend 20s. per share more to prove the mine. He was happy to say that each member of the committee, and some of the largest shareholders with whom he had communicated, agreed with him. (Hear, hear.) When the present company purchased the mine the western portion was held out as merely presenting fair promise, so that operations were continued only at the point where the engine had been placed, and where they hoped to achieve success. Hearing so many opinions with respect to the western part of the mine, he took the opportunity, when in Cornwall, to have Hicks's shaft cleared out and thoroughly drained. An elvan course and a cross lode were found, and certainly nothing could be more encouraging than the appearance of the latter, being of a quartzose character, and containing fine cubes of lead. Mr. Clemes told him that he was an adventurer he should not doubtfully be prepared to pay 20s. or 2l. per share to develop Hicks's shaft alone. Taking all these circumstances into consideration, he did not think they could do any other than to push forward this point, which presented so many encouraging features. In the meantime, some returns might be obtained from the eastern portion. He had been informed that the previous company had great difficulty in securing the western ground; there appeared to be a high opinion of it, and it was considered a property that should be worked separately.

Mr. W. H. LANTON (of Truro) said he had received a report from Mr. Henty, one of the Great Vent agents, to the effect that he was much pleased with the general appearance of the lode at Hicks's shaft, and that from the favourable character of the stuff there was a fair chance of making a good discovery at that point.—Mr. EDWARD COOKE said that, perhaps, next to their worthy Chairman, he was the most largely interested in the success of the mine, although he did not hold so large a pecuniary interest in the concern as many others did. Although no one regretted more than himself that success had not been realised by the capital subscribed, he would not resign from the fact that the prospects still held out in the eastern part of the mine were of that character that it would be cowardly to suspend operations. As to Hicks's shaft, however, although he did not pretend to have any practical knowledge of mining, the

meeting would bear testimony to the fact that from the commencement of the concern he had always expressed the highest opinion of that part of the mine. What had just transpired in the adjoining mine (Wheel Chiverton) should certainly be an encouragement for them to continue, and the more particularly as it was stated at the Mineral Bottom Mine meeting that the lode which had been recently discovered at the Chiverton Mine would most likely be found in North Chiverton, and there were other lodes which had not yet been developed. Mr. West, to whose opinion he (Mr. Cooke) was bound to pay respect, who represented the Ecclesiastical Commissioners, when application was made to him for the western part of the mine, stated that it ought to be worked as a separate company, for he believed that would be the best part of the mine. It was his hope and his belief that when the western part of the mine was developed the shareholders would be well repaid for their outlay.

The report was received, and ordered to be entered on the minutes, and the accounts were passed and allowed.

The CHAIRMAN said it was proposed to make a call of 10s. per share. Mr. E. COOKE said that when the shareholders knew that their worthy Chairman, who had had great experience in mines, and had brought one of the largest mines in Cornwall into a highly productive state, was prepared, as one of the largest holders in North Chiverton, to pay 20s. per share more for the further development of the mine, they certainly had a great deal to encourage them to vigorously continue their operations. He would, however, suggest that the proposed call should be divided into two instalments.

It was eventually agreed that a call of 10s. per share should be made, payable in two instalments, 5s. on Nov. 23, and 5s. on Jan. 28.

Mr. COOKE apologised for the absence of Mr. Peter Watson, on account of indisposition.

Mr. W. H. LANTON proposed a vote of thanks to the Chairman, and, as a Cornishman, took the opportunity of testifying to the deservedly high opinion which was entertained of Mr. Noakes throughout Cornwall. Such was the reputation of the Chairman throughout Cornwall that anyone associating themselves with any mine under his management would be perfectly satisfied, it even a "blink of an eye" was never found. Such was the opinion of his management that they felt assured they would have 20s. worth of work for every 20s. which they expended. (Hear, hear.)

Mr. COOKE seconded the proposition, which was put and carried unanimously. The CHAIRMAN having acknowledged the vote, the proceedings terminated.

#### PEDNARDREA UNITED MINING COMPANY.

The usual general meeting of shareholders was held at the offices of the company, 15, New Broad-street, on Nov. 6.

Mr. CHARLES MARTIN in the chair.

The SECRETARY (Mr. G. H. Cardozo) having read the notice convening the meeting and the minutes of the preceding meeting, which were signed by the Chairman, proceeded to read the report of the agents on the condition and prospect of the mine.

Capt. W. Tregay and J. Thomas in their report entered very fully into the particulars of the mine up to the present time, and as to the north mine, stated that "the lode opened since the last meeting by the 55 cross-cut is large, strong, and productive. In the 55, west of cross-course, it is 10 feet wide, worth 25l. per fathom. We have opened a shaft from surface, which struck the lode at the 20, and is there continued on its course to the 55. In the 47, 40, 30, and 20, we have opened levels. Although the lode is not as productive generally in these levels as at the 55, it is productive so far as seen, which in the 20 is upwards of 100 fathoms in length. We have tribute pitches at work at each of those levels, at 12s. and 12s. 6d. in 1l., from which we have sampled, since we commenced hauling there on Aug. 12, upwards of 15 tons of black tin, and this produce is increasing. This lode, we are now satisfied, we have not driven far enough to intersect in our 30 north cross-cut by some 5 or 6 fathoms, and we purpose continuing it."

The CHAIRMAN said the report that had now been read was undoubtedly the best and most promising they had received for some time past. What was said about the north lode was particularly encouraging, and gave them good reason to hope that it would not be long before they found the mines in a prosperous and profitable condition. They might call it a new point of operation, and it was not only full of promise but it was one that could be worked at a comparatively small cost. He was glad, too, to be able to say that even at present the expectations the manager had induced them to form had been more than realised. (Hear, hear.)

The SECRETARY said there seemed to be little doubt that this north lode was going to give them a permanent return of tin. It had not returned upwards of 16 tons of black tin, and they could work that part of the mine at a profit.

Mr. THOMSON asked how far this lode was from the old one?

The SECRETARY replied that it was only about 18 fms. distant.

Mr. CARPENTER thought that the report was an eminently satisfactory one, and had no doubt that it would be so deemed by the shareholders at large. (Hear.) The SECRETARY said it might be well to bring before the meeting a report or letter that had been received from Capt. Tregay early in August last, as it would show them how greatly they had improved since that time. In that letter he gave them reason to hope that at no distant period they would find the north lode productive. As he (the Secretary) had already stated, the lode had already returned about 900l. worth of tin, and the levels were only now being developed as deep as the 55; and as the 90 fm. level cross-cut, in the old mine, was now within about 5 fms. of this new lode, great expectations might fairly be entertained of it.

Mr. HORACE GREEN wished to know whether it would not be as well to cease working in the old mine for the present, and confine themselves to the new one—he meant the north lode, inasmuch as it appeared that they could work that at a profit even at present, while there was almost a certainty of greatly increasing their present returns?—The CHAIRMAN replied that they had some fine prospects in the old mine, which he, for one, should not like to abandon even for a time; besides which, he believed they were obliged to keep at work there, in order to prevent the water draining into the north mine.

The SECRETARY, in reply to a question, said it would be quite possible to dam the water out of the old mine if it should become necessary to do so.

The SECRETARY then read the financial statement, and after some conversation, Mr. CARPENTER moved and Mr. GREEN seconded that the report and financial statement be adopted, and printed for circulation amongst the shareholders, which was agreed to.—It was then resolved that a call be now made of 15s. per share, payable in three instalments.

Mr. THOMSON asked whether it was not the fact that all the neighbouring tin mines were, without exception, in a profitable condition at a greater depth than the bottom levels in this mine? The SECRETARY replied in the affirmative. He meant the north lode, inasmuch as it appeared that they could work that at a profit even at present, while there was almost a certainty of greatly increasing their present returns?—The CHAIRMAN replied that they had some fine prospects in the old mine, which he, for one, should not like to abandon even for a time; besides which, he believed they were obliged to keep at work there, in order to prevent the water draining into the north mine.

The CHAIRMAN said the shareholders were aware that this meeting had been called in conformity with the provisions of the Companies Act, which required every company within four months after its formation to call a general meeting of its shareholders. He could not, however, conceive the object of the Legislature in making it compulsory, because in many cases it came to this—that the directors came before the shareholders with very little more to say than when the prospectus was originally issued. However, as such was the law, and the shareholders had been called together in conformity therewith, he would avail himself of the opportunity to make a few remarks with respect to the affairs of the company. In the first place, he might mention that Capt. Treloar and his staff left yesterday for Brazil, for the purpose of conducting the mine in the most profitable manner. He would, therefore, confine his remarks simply to a short statement of the progress of the mine, and the results attending the development of the Jacotinga formation. When some years since he addressed the shareholders in the original company—the Don Pedro North del Rey—over which he had the honour of presiding, he remembered informing them that a Jacotinga formation had been secured, in addition to the rock formation in the Morro Santa Anna property. What the results had been they all knew. Suffice it to say, therefore, to those who were not shareholders in Don Pedro, that the directors had been enabled during 1867 to return in dividends 15s. per share on each share with 14s. paid, and that up to the present time for this year there had been paid 4s. 6d. per share, and at the forthcoming meeting, to be held at the end of the present month, he should propose a further dividend of 3s. 6d. per share; and it was his opinion, which he would then state, that before the close of the current year the directors would be in a position, from the financial results of the working of the mine, to declare a dividend of not less than 100 per cent. per annum. (Hear, hear.) With regard to the General Brazilian Mining Company, Capt. Treloar brought the three properties under his notice, and the result was the formation of the undertaking. There were three large properties—not three mines, which was a totally different thing—which had been worked from time immemorial, and had always been known to yield very large and splendid results from the Jacotinga formation. Even comparatively recently the shareholders in the Don Pedro Company were endeavoured to be frightened at the dreadful uncertainty of the Jacotinga formation. But what had they found—that although the produce had varied from time to time, yet that the smallest amount of profit accruing was 50 per cent. and the largest considerably over 100 per cent. of the outlay; and when the variation was between 50 and 100 per cent., he thought that favourably compared with the results realised from the development of the rock formation which was usually worked in Brazil. His opinion was that at a very early date after the General Brazilian Company had obtained possession of their properties, allowing a short time for Capt. Treloar to develop them, the enterprise would rise to a very high position. He believed such reports would be circulated from time to time, showing the results of the workings, and especially the realised profits, which would place the undertaking at the very head of the list of mines. He hoped and trusted that when he met the shareholders again, at the end of the year, he would be able to inform them that results had been realised corroborative of the statements he was now making entirely upon the facts as submitted to him by Captain Treloar, in which case the results would be very large. (Hear, hear.)

#### GENERAL BRAZILIAN MINING COMPANY.

The first general meeting of shareholders was held at the London Tavern, Bishopsgate, on Tuesday.—Mr. HENRY HAYMEN in the chair.

Mr. JOHN E. DAWSON (the secretary) read the notice convening the meeting.

The CHAIRMAN said the shareholders were aware that this meeting had been called in conformity with the provisions of the Companies Act, which required every company within four months after its formation to call a general meeting of its shareholders. He could not, however, conceive the object of the Legislature in making it compulsory, because in many cases it came to this—that the directors came before the shareholders with very little more to say than when the prospectus was originally issued. However, as such was the law, and the shareholders had been called together in conformity therewith, he would avail himself of the opportunity to make a few remarks with respect to the affairs of the company. In the first place, he might mention that Capt. Treloar and his staff left yesterday for Brazil, for the purpose of conducting the mine in the most profitable manner. He would, therefore, confine his remarks simply to a short statement of the progress of the mine, and the results attending the development of the Jacotinga formation. When some years since he addressed the shareholders in the original company—the Don Pedro North del Rey—over which he had the honour of presiding, he remembered informing them that a Jacotinga formation had been secured, in addition to the rock formation in the Morro Santa Anna property. What the results had been they all knew. Suffice it to say, therefore, to those who were not shareholders in Don Pedro, that the directors had been enabled during 1867 to return in dividends 15s. per share on each share with 14s. paid, and that up to the present time for this year there had been paid 4s. 6d. per share, and at the forthcoming meeting, to be held at the end of the present month, he should propose a further dividend of 3s. 6d. per share; and it was his opinion, which he would then state, that before the close of the current year the directors would be in a position, from the financial results of the working of the mine, to declare a dividend of not less than 100 per cent. per annum. (Hear, hear.) With regard to the General Brazilian Mining Company, Capt. Treloar brought the three properties under his notice, and the result was the formation of the undertaking. There were three large properties—not three mines, which was a totally different thing—which had been worked from time immemorial, and had always been known to yield very large and splendid results from the Jacotinga formation. Even comparatively recently the shareholders in the Don Pedro Company were endeavoured to be frightened at the dreadful uncertainty of the Jacotinga formation. But what had they found—that although the produce had varied from time to time, yet that the smallest amount of profit accruing was 50 per cent. and the largest considerably over 100 per cent. of the outlay; and when the variation was between 50 and 100 per cent., he thought that favourably compared with the results realised from the development of the rock formation which was usually worked in Brazil. His opinion was that at a very early date after the General Brazilian Company had obtained possession of their properties, allowing a short time for Capt. Treloar to develop them, the enterprise would rise to a very high position. He believed such reports would be circulated from time to time, showing the results of the workings, and especially the realised profits, which would place the undertaking at the very head of the list of mines. He hoped and trusted that when he met the shareholders again, at the end of the year, he would be able to inform them that results had been realised corroborative of the statements he was now making entirely upon the facts as submitted to him by Captain Treloar, in which case the results would be very large. (Hear, hear.)

A SHAREHOLDER asked if the Chairman could give any idea when Captain Treloar was likely to complete final arrangements?—ANOTHER SHAREHOLDER asked if the amount of the undertaking was to be purchased with fixed? The CHAIRMAN said that by replying to those questions he would be going into details which might act antagonistic to the interests of the company if they

were to get abroad. Capt. Treloar only left yesterday for the Brazils, and if he (the Chairman) were now to answer the questions that had been put the result might be to the disadvantage of the shareholders. (Hear, hear.) And he had now no doubt that the whole of the properties would be conveyed to the company upon most satisfactory terms. If any bona fide shareholder would kindly call at the office he would get every information he required; but he (the Chairman) was most anxious that nothing should be used detrimental to the company's interest.

Upon the proposition of Mr. BINGLEY, seconded by General HURDLE, a vote of thanks was passed to the Chairman.

The CHAIRMAN having acknowledged the vote, stated that he hoped the money the shareholders had invested would return, as he fully believed it would, a very handsome result, even beyond what they could anticipate. (Hear, hear.) The meeting then separated.

#### CAPULA SILVER MINING COMPANY.

A general meeting of shareholders was held at the City Terminus Hotel, Cannon-street, on Thursday.—Mr. J. PHILLIPS in the chair.

Mr. GEORGE F. SMITH (the secretary) read the notice convening the meeting. The report of the directors was taken as read.

The CHAIRMAN said, since the report was issued a letter had been received from the manager in Mexico which gave some additional information with respect to the position and prospects of the mine. It appeared that although there were difficulties, there were also matters upon which they might congratulate themselves. For instance, they might congratulate themselves upon the appearance the mine continued to present; there seemed to be still further evidence that it was one likely to become very productive, and, he hoped by-and-by, very profitable. He would not, however, detain the meeting with any remarks of his own, but would rather invite questions from the shareholders. He would, therefore, content himself by moving that the report and accounts be received and adopted.

Mr. HILL seconded the proposition, and took the opportunity of enquiring of the directors whether Capt. Paul was not liberal of his promises, while he forgot their performance? He should also like to know if the money and ore on hand would be sufficient to carry them through; because, if such were the case, he should be satisfied.

The CHAIRMAN confessed that he in some measure participated in the disappointment which it appeared was felt by some of the shareholders—for instance such progress had not been made with the reduction works as he had hoped would have been made; some allowance, however, must be made for the difficulties in obtaining machinery and skilled labour. There was reason to hope that they would see greater progress than hitherto, the more particularly as the directors had sent out funds to assist Captain Paul in the more rapid completion of the works.

Mr. CHYNOWETH (a director) said that Capt. Paul had had 30 years' experience of the country, and throughout that period had been connected with mines, especially underground workings. Capt. Paul had also conducted the reduction of ores; therefore, he combined every qualification necessary for his position. As to the mine, from the general nature of the ground, and the aspect of the lode, he certainly was persuaded that the company was in a promising condition. It was true that as long back as 1866 Capt. Paul and himself selected the position for the hacienda, but immediately afterwards Capt. Paul was beset with difficulties, which culminated in the revolution of the empire and the fall of Maximilian, so that Captain Paul's operations, as far as the hacienda was concerned, were completely paralysed. Since then, however, he (Mr. Chynoweth) most expertly he had seen that the works had not been carried out, and he could only attribute it to the fact that a difficulty existed in obtaining skilled workmen.—Mr. TREWEDY entered into the disappointment expressed by other shareholders, but thought the explanation was in the fact that the disturbed state of the country had prevented any work being carried out that required skilled labour.

Mr. REED asked what was the present yielding capability of the mine?—Mr. CHYNOWETH believed that at the present time the mine was not capable of yielding more than 100 cargas of ore per week; but taking the character of the ground into account he expected, when the shafts were down and the levels extended, to see the returns increase up possibly to 1000 or 1500 cargas per week.

The CHAIRMAN, in reply to a question, stated that the directors were still in hopes not only that they would not require to make the remaining call of 2s. 6d. per share, but they might be able to go on with their present funds.

The report was received and adopted.

A vote of thanks to the Chairman terminated the proceedings.

#### [ADVERTISEMENTS.]

From Mr. EDWARD COOKE:—The market has been only moderately active during the week. This is only a natural consequence after the continuous rise that has taken place in the price of the shares in several mines. Attention should now be turned to other mines that possess excellent prospects, and standing at very low prices in the market. I cannot do better than refer to those named in my article in last week's Journal. The accounts I receive from NEW WHEEL LOVELL are of a very encouraging kind, and on referring to the agent's report, in another column, it will be seen that a fine mine is being opened up there, and yet the mine is selling at less than 5000l. for its entirety. FRANK MILLS MINE continues to open up well, and leaving good profits to the shareholders. A paragraph appeared in last week's Journal, relative to the financial position of this company. I may say, without fear of contradiction, I believe that there is no mining company in Devon or Cornwall, or, in fact, anywhere, in which the statement of accounts are laid more fairly before the shareholder, or charged up so close. The costs are charged up to Sept. 12, and which are not really payable until Saturday (this day). The lead credited was sold on Oct. 10; and if you are conversant with these matters are aware that this parcel of lead was part of the produce of September month, as the lead is generally sampled a fortnight before it is sold; and although the September costs are only payable this day, there are about 70 tons of lead broken and dressed towards the next sale; this, with the balance of 1076l. carried forward at the last meeting, and the mine still producing large quantities of lead, will, I think, satisfy the shareholders that they have in Frank Mills a good and lasting dividend property.

No new feature has transpired with regard to the disputed boundary between CHIVERTON and the MINERAL BOTTOM MINES. The former mine continues to lead, both north and south, and, from present appearances, the shareholders who have held on their shares so long at high prices are by no means unlikely to see all their outlay return with good interest. The discovery in Chiverton encourages the NORTH WHEEL CHIVERTON COMPANY to prosecute the western part of their property with vigour. A new shaft is being sunk at what is termed Hicks's part, and the indications of an early discovery of lead are already very favourable, and in three months more elapse I hope to have the pleasure of congratulating my friends on being shareholders in this mine. At any rate, I am very certain that under its present able management nothing will be wanting to bring about a successful result. My confidence is still unshaken in the real merits of the property. CHIVERTON VALLEY shares are now attracting attention. The shaft is nearly down 75 fathoms from surface. It was intended to have driven a level at 65 fms. deep. The deeper level will, however, be more advantageous, as it will give more backs when the lead dipping from Chiverton Moor into the former mine is intersected. I look upon Chiverton Valley as being a very excellent speculation. The shares, I doubt not, have a great rise upon the intersection of the lead alluded to. There appears to be no speculation about meeting with this lead, but only the question now of weeks to cut it. PRESTARENA GOLD MINING shares at the present moment offer the greatest inducement to parties having capital to lay out. The returns of gold are continuous, and the report just received from the mines very good indeed. The shares are extremely low in price, and should be bought at once, and held for a few months, and I feel confident the result will be highly satisfactory to the investor.

From Messrs. WARD and JACKMAN:—In looking out for a productive channel for the investment of available means, the public will do well at the present moment to investigate the advantages of mining shares, which now, perhaps more than ever, possess attractions far superior to many other investments. We predict several weeks since the extensive revival of business in the Mining Share Market, which has taken place; and it is gratifying to notice the marked improvement in the character of current transactions. There is a visible diminution of reckless speculation in connection with the bi-monthly account (except in one or two of the favourite mines), which has to a large extent given place to bona fide sales and purchases, consequent upon an accession of orders from various parts of the country, and towards the end of the year it is exceedingly likely that the demand for various classes of stocks and shares will further revive, and this is a cogent reason why those who contemplate the purchase of really eligible investments should at once make their selection while quotations remain comparatively low. STRAY PARK, adjoining Dolcoath, has been worked, we believe, from time immemorial, and has yielded very large profits. We remember the shares at 60l. each, and are informed the mine is greatly improved. The shares have been in great request, and will very likely rise considerably. At NORTH ROSKEAR they have a very fine-looking lode in Pearce's shaft, sinking under the 205 fm. level; it is 6 ft. wide, and worth for the length of the shaft (11 ft.) 70l. per fathom at the present standard of copper ore. At EAST SERTON they have a very good lode in the 10, east of eastern shaft, producing at present about 1/2 ton of copper ore per fathom. CHIVERTON VALLEY will very soon become a prominent market mine, and an investment at present price would, we believe, well repay the investor. From private sources (via New York), we learn that the remittance from the CHIVERTON GOLD MINING COMPANY this time will be over 1600l. WHEEL CHIVERTON (the motor of the mining market at present) has again fluctuated in value; the present price of the shares is in some measure attributed to the rumour current that the shareholders are likely to be made plaintiffs in an action at law against the adjoining property—the Mineral Bottom, which, it appears, have given great offence to some of the shareholders in the former mine, by recommending operations which had been suspended, and but for the late improvement in Chiverton, they admit, would not have been done. Parties who remember the West Basset and South Frances litigations, are naturally anxious to sell out at any price. At GARN BREA the different points of operation are valued at over 500l. per fathom. This property is selling for under 20,000l.

COUGHS, COLDS, AND INFLUENZA CURED BY DR. LOCOCK'S WAFERS. Mr. Horsfield, Chemist, Sweet-street, Leeds, writes: "I have received a letter from a minister of this town, in which he speaks very highly of the benefit he has derived from the use of Dr. Locock's wafers. To my own knowledge they are the best remedy for coughs, colds, and influenza.—Dr. Locock's wafers give instant relief to and rapidly cure asthma, consumption, coughs, and all disorders of the breath and lungs. Throat affections are immediately relieved by allowing a wafer occasionally to dissolve in the mouth. To singers and public speakers they are invaluable for clearing and strengthening the voice. They have a pleasant taste. Price 1s. 1/4d., 2s. 9d., 4s. 6d., and 11s. per box.

HOLLOWAY'S PILLS.—COMFORT FOR THE AFFLICTED.—When the blood becomes impure through breathing foul air, or through the imperfect performance of any bodily function, the greatest benefit will be derived from these pills, whose purifying, alterative, and tonic virtues are too well known to need any commendation here. After taking a few doses a marked amendment will be felt from day to day; the appetite will grow better, the stomach stronger, the liver wholesomely active, and the bowels naturally regular. While taking these pills there is no danger of catching cold, nor are any save the simplest precautions (plainly set forth in the "directions for use") necessary for securing the full beneficial results derivable from this well known, world-esteemed medicine.



## WATSON BROTHERS' MINING CIRCULAR

WATSON BROTHERS,  
MINING AGENTS, STOCK AND SHARE DEALERS, &c.,  
1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON.

**Messrs. WATSON BROTHERS** return their most sincere thanks for the great patronage bestowed and confidence reposed in their firm for 25 years, and to assure their friends and clients it will be their earnest endeavour to merit a continuance of both.

Messrs. WATSON BROTHERS have made arrangements for continuing their weekly Circular, which has had a large circulation for many years, to the columns of the *Mining Journal*, their special reports and remarks upon mines and mining, and state of the share market, will in future appear in this column. In the year 1843, when Cornish mining was almost unknown to the general public, attention was first called to its advantages, when properly conducted, in the "Compendium of British Mining," commenced in 1837, and published in 1843, by Mr. J. Y. WATSON, F.G.S., author of "Gleanings among Mines and Miners," "Records of Ancient Mining," "Cornish Notes" (first series, 1862), "Cornish Notes" (second series, 1863), "The Progress of Mining," with statistics of the Mining Interest, annually for 21 years, &c., &c. In the Compendium, published in 1843, Mr. WATSON was the first to recommend the system of a "division of small risks in several mines, ensuring success in the aggregate," and Messrs. WATSON BROTHERS have always a selected list on hand. Perhaps at no former period in the annals of mining has there been more peculiar need of honest and experienced advice in regard to mines and share dealing than there is at present; and, from the lengthened experience of Messrs. WATSON BROTHERS they are emboldened to offer, thus publicly, their best services to all connected with mine or the market, as they have for so many years done privately, through the medium of their own Circular.

Messrs. WATSON BROTHERS transact business in the purchase and sale of mining shares, and other securities, payments of calls, receipt and transmission of dividends, obtaining information for clients, and affording advice, to the best of their knowledge and judgment, based on the experience of more than 30 years active connection with the Mining Market.

Messrs. WATSON BROTHERS also inform their clients and the public that they transact business in the public funds, railways, docks, insurance, and every other description of shares dealt in on the Stock Exchange.

Messrs. WATSON BROTHERS are also daily asked their opinion of particular mines, as well as to recommend mines to speculate in, and they give their advice and recommendations to the best of their judgment and ability, founded on the best practical advice they can obtain from the mining districts, but they will not be held responsible, nor subject to blame, if results do not always equal the expectations they may have held out in a property so fluctuating as mining.

Messrs. WATSON BROTHERS having agents and correspondents in all the mining districts, and an extensive connection among the largest holders of mining property, have the more confidence in tendering their advice on all matters relating to the state and prospects of mines and mining companies, and are able to supply shares in all the best mines at close market prices, free of all charge for commission.

**SATURDAY, NOV. 7.—Market rather quiet.** East Caradon, 5 to 5½; Great Laxey, 20 to 21; West Chiverton, 61 to 62; in demand; Prince of Wales, 40s. to 42s.; Wheal Chiverton, 33½ to 34; Don Pedro, 33½ to 34; Yudanamutana, 23½ to 25; Great Vor, 13 to 14; Marke Valley, 8½ to 9.

**Monday.**—Market very quiet. Chiverton, 61 to 62; West Chiverton, 61 to 62; West Seton, 185 to 190; Mineral Bottom, 18 to 19; Prince of Wales, 38s. to 40s.; Thieroff, 16 to 17; Don Pedro, 33½ to 34; Chiverton Moor, 6 to 6½; Chontales, 23½ to 25; West Frances, 33 to 35.

**Tuesday.**—Market again very quiet. Great Laxey, West Chiverton, and Stray Park chiefly dealt in. Great Laxey, 20½ to 21½; West Chiverton, 61 to 62; Stray Park, 4 to 5; Prince of Wales, 38s. to 40s.; Chiverton Valley, 3 to 3½; Grebber, 8s. to 9s.; Great Vor, 13 to 14; East Grenville, 4 to 4½; Chontales, 23½ to 25; Don Pedro, 33½ to 34.

**Wednesday.**—Active demand to-day for West Chiverton, Chiverton, Stray Park, Marke Valley, Great Laxey, East Caradon, and South Condurrow. West Seton and Prince of Wales flatter. West Chiverton, 61 to 62; Stray Park, 4 to 5; Chiverton, 4 to 4½; Marke Valley, 8½ to 9; Great Laxey, 19½ to 20½; East Caradon, 5 to 5½; South Condurrow, 18s. to 17s. 6d.; West Seton, 185 to 190; Prince of Wales, 38s. to 40s.; Grenville, 30s. to 35s.; East Grenville, 4 to 4½; Chontales, 23½ to 25; Don Pedro, 33½ to 34.

**Thursday.**—Market very quiet. West Chiverton, 61 to 62; Chiverton, 4 to 4½; Marke Valley, 8½ to 9; Great Laxey, 19½ to 20½; East Caradon, 5 to 5½; South Condurrow, 18s. to 17s. 6d.; West Seton, 185 to 190; Prince of Wales, 38s. to 40s.; Grenville, 30s. to 35s.; East Grenville, 4 to 4½; Chontales, 23½ to 25; Don Pedro, 33½ to 34.

**Friday.**—Settling-day, and market quiet. West Chiverton, 61½ to 62½; West Seton, 190 to 200; Chiverton, 4½ to 4½; South Condurrow, 17s. to 19s.; chiefly dealt in; Prince of Wales, 38s. to 40s.; East Grenville, 3½ to 4½; and Chontales, 23½ to 25.

## Mining Correspondence.

## BRITISH MINES.

**ABRAHAM CONSOLS.**—J. Vivian, Nov. 12: In the 27, driving east of shaft, the lode is 8 in. wide, worth 4½ per fathom for tin, and indicates further improvement. The 27, west of shaft, is suspended for the present, and these men put to rise for ventilation of air. The lode in the rise is 18 in. wide, worth 6½ per fathom for tin.

**BEIDFORD UNITED.**—James Phillips, Nov. 11: The lode in the shaft is still worth from 8 to 9 tons of ore per fathom, for the length of the shaft. The lode in the 30 east is 4 feet wide, worth from 5 to 6 tons of ore per fathom. In the 75 east the lode is worth 5 tons of ore per fathom. The stopes average about 4 tons of ore per fathom. The pitches are yielding about their usual quantity of ore.

**BRONFLOYD UNITED.**—Thomas Kemp, Nov. 11: Settings for November: Since last report we have had to suspend for 10 days drawing at the new shaft, for the purpose of fixing the new drawing-machine to the other work. I am pleased to say it is completed, and the drawing-machine, with the new incline, is now working well. The 73 fm. level cross-cut, to the south of new shaft, is set to six men, at 16s. per fathom, to drive through the lode. This bargain has been idle since last report, owing to the above-named cause, and the level being full of stuff. We have resumed drawing to-day, and the men will now go on with their bargain uninterrupted. Four men to open on and stope the lode west of cross-cut, in the 62, at 70s. per fathom; the lode here is looking well, and is worth fully 2 tons of ore per cubic fathom. The winze sinking below this level is without change, and for the length of it (9 ft. by 6 ft.) is worth 3 tons of ore per fathom in depth. Eight men to stope under the 52, at 70s. per fathom; the lode here is now working about 2 tons of ore per cubic fathom. A stop to the west of winze, in the back of the 52, is continued by six men, day work, lode producing fully 1 ton of ore per cubic fathom. Four men to drive the 40 end west, at 75s. per fathom; lode without change. On Saturday last we sampled 60 tons of lead ore, for sale on the 17th inst.

**BRYNSTWITH.**—J. Tregoning, Nov. 9: In the deep cross-cut north, since I last wrote, we have come upon a branch of spar, with much water; I am satisfied that we are not far from the lode. We are still cutting through branches of spar in the western end. The rise over the end of the adit east is turning out good ore. I have set the air-pipe to make, per contract of 6d. per fathom. The floorings are in good order, also the levels and underground work generally.

**CAPE CORNWALL.**—R. Pryor, F. Hosking, Nov. 10: The following bargains were set on Saturday last:—The 100 cross-cut to drive north of engine-shaft, by four men, at 8½ per fm. The 100 fm. level to drive south of shaft, by two men, at 4½ per fm. The 70 cross-cut to drive south of shaft, by two men and one boy, at 13s. per fm. Looking at the character of the ground in these two cross-cuts (70 and 100), we think we are near the lode at each point. The 70 is still in the green stone, and the 100 is strongly mineralised with mundle and spots of copper ore.

**CARADON CONSOLS.**—S. Bennetts, Nov. 10: The gossan lode in the 78 west presents a very fine appearance, a full end wide, and although there is not in the gossan much ore, yet I think near this there is something good. The Clyno's lode, in the 78 west, is producing about 1 ton of ore per fathom.

**CARN AMBORN.**—John Truscott, Nov. 11: The ground in sinking the engine-shaft below the 70 continues favourable, and good progress is being made. In the 70 west, for the part carried, which is 15 in. wide, it is worth 18½ per fm. the lode presenting very encouraging appearances. In the 60 west the lode is small, but will, probably, improve as we get further off the cross-course. The stopes and pitches continue just of the same value as when last reported.

**CASHWELL.**—John Peart, Nov. 7: The vein in drift below Scar Limestone has been and continues hard, but still shows a good vein and part ore. No. 1 stop next to the above drift forehead has been very rich for the last four weeks, and has every appearance of continuing to produce well. We are making a rise into the Slaty Hazle from drift below this stratum, but have not yet got up to the bearing part. There are two men raising ore in the Slaty Hazle, a little west of this rise, which is paying well. At Dauke's Mine a rise is being made into the Slaty Hazle but have not yet got high enough to prove whether the vein will be productive or not. We sold on Oct. 30, to Messrs. Jacob Walton and Co., Bohlhope Smelt Mills, 63 tons 12 cwt. of lead ore, at 12½ per ton.

**CASTELL CAIN DOCHAN (Gold).**—J. Parry, Nov. 10: The character of the ground in the forepart of the deep cross-cut is much the same as last reported, but we have cut into two narrow strings of quartz, which are probably feeders belonging to the lode.

**CHANTICLEER.**—William Wasley, Nov. 12: The lode in the sump in bottom of the 110 yard level is producing some very nice lumps of ore, and looking very likely for an improvement; but, as we are now troubled with water in clearing the old sump in the bottom of the 90 yard level, I have put the men there for a few days, to see if we can get to the bottom of it, and make a communication with the rise in the roof of the 110 yard level, which will thoroughly ventilate the mine.

**CHIVERTON.**—J. Juleff, J. Borlase, Nov. 12: In the 20, south of No. 1 cross-cut, the lode is 2 feet wide, worth 6 cwt. of lead per fathom. In the 20, north of No. 2 cross-cut, the lode is 18 inches wide, worth 12 cwt. of lead per fathom. The new shaft is down 6 fathoms, and the rise is up 2 fathoms 4 feet above the 20 fm. level.

**CUIDRA.**—F. Puckey, Nov. 11: In the 142, west of Walker's shaft, we are cutting out the lode, and have cut into it 4 feet; as far as seen the lode is looking very promising, composed of quartz and a good-natured peach, and occasionally producing good stones of tin. In the stopes in the back of the lode, east of the winze, no lode has been taken down since last reported on. In cutting out the lode, and stopping the same in the 130, the lode is without change, still very large, and in places producing good work for tin. The stopes in the bottom of the 100, from the winze, is 8 ft. wide, and worth 20s. per fathom. In the two stopes in the back of the 100 the lode is without alteration, still 8 ft. wide, at 4 worth 15s. per fathom. All our operations, both underground and at surface, are being urged on as fast as possible.

**CWM DAREN.**—R. Clocker, Nov. 11: The men are making fair progress in sinking the engine-shaft, which is in good ore lode for 8 ft. 6 in. wide, but the course of it in the present bottom is better than it has at all been, and the lode continues to yield a larger quantity of rich silver-lead ore the deeper we get down. The brace of the shaft is so crowded with ore stuff that we are obliged to add another boy and girl to our picking force, so as to get rid of the ore to make

room for further drawing; of course, the selected ore is for crushing, and preparing for the market.

**DRAKE WALLS.**—Thos. Gregory, Nov. 12: We have cut through the bar of capels in the 50, east of Brenton's shaft, and the branches have again improved to 15s. per fathom. We have communicated No. 1 winze below the 50, east of Brenton's, with the 60, which has laid open a profitable piece of stopes ground. The branches in No. 2 winze, west of Brenton's, are worth 12s. per fathom. Good progress is being made in the 60 fm. level cross-cut south towards No. 2 winze, and there are indications of being near the south tin branches. There is no change to report in any other part of the mine.

**EAST CARADON.**—J. Truscott, Nov. 11: Caunter Lode: The 115 east is now worth 5½ per fathom. The 100, east and west, is poor. The 90 east is worth 5½ per fathom. South Lode: The 70 west is worth 5½ per fathom. Child's Lode: The 80 east is poor. The 80 west is worth 30s. per fathom. The 70 east is worth 5½ per fathom. The 70 west is worth 15s. per fathom.

**EAST CARN BREA.**—I. Richards, Nov. 11: The lode in Thomas's engine-shaft is 15 in. wide, composed of capel, quartz, mundle, and good stones of copper ore. Thomas's Engine-shaft—No. 3 Lode: The lode in the 90 west is 1½ ft. wide, consisting of quartz, capel, mundle, and a little copper ore. A rise (Ayer's) is being put up in the back of the 90 west, the lode in which is 3 ft. wide, producing saving work of tin and copper ores. The lode in the 80 west is 3 ft. wide, consisting of capel, quartz, and good stones of tin and copper ores. The lode in Biewet's rise, in the back of the 80 west, is 15 in. wide, and worth 1½ ton of copper ore per fathom. The lode in the 80, east of Davie's cross-cut, is 15 in. wide, consisting of quartz, capel, fluor, and saving work of copper ore. The lode in the 80, west of Davie's cross-cut, is 1 ft. wide, consisting of capel, quartz, mundle, and stones of copper ore. The lode in William's rise, in the back of the 50 west, is worth 1 ton of copper ore per fathom. The lode in the 40 west is worth 1 ton of copper ore per fathom. The lode in the 60, east of Buckley's shaft, is 2 ft. wide, composed of capel, quartz, mundle, and a small portion of copper ore.

**EAST PROVIDENCE.**—J. Nancarrow, W. White, Nov. 7: At our survey to-day the following work was set:—Boorman's shaft to sink below the 106, by nine men and three boys, at 30s. per fm.; the lode recently came into the shaft 1½ ft. wide, and yields tin to save, and is likely to improve, as the granite about the lode is greatly changed, and is now most congenial for tin. The 106, to drive east of Boorman's, by six men, at 7½ per fm.; this end is expected to reach the carbona lode in another month. The 94 to drive south-east on the carbona lode, by four men, at 4½ per fm.; here we have a large tinny lode coming into the end; we already see it 3 ft. wide, but have not yet reached the north wall. The 70 east to drive 60 ft. mer, at 9½ per fm.; good congenial for tin. The 50 to drive east by two men, at 3½ per fm.; lode still disordered by the cross-course. The 40 to drive east by two men, at 4½ per fm.; lode small. We have also set 13 pitches, to 26 men, at 12s. 3d. in 11.

**EAST ROSEWARNE.**—C. Glasson, Nov. 5: In King's shaft sinking below the 215, the lode is 10 in. wide, composed of a beautiful soft spar, mundle, and copper ore, worth 6½ per fm. In the 115, west of shaft, the lode is 10 in. wide, worth 6½ per fm. In the 115, east of shaft, the lode is 12 in. wide, worth 3½ per fm. The 70 east to drive 60 ft. mer, at 9½ per fm.; good congenial for tin. The 50 to drive east by two men, at 3½ per fm.; lode still disordered by the cross-course. The 40 to drive east by two men, at 4½ per fm.; lode small. We have also set 13 pitches, to 26 men, at 12s. 3d. in 11.

**EAST ROSEWARNE.**—Charles Glasson, Nov. 12: At King's shaft, sinking below the 215, the lode is 10 in. wide, worth 6½ per fm. In the 115, west of shaft, the lode is 12 in. wide, worth 3½ per fm. The 70 east to drive 60 ft. mer, at 9½ per fm.; good congenial for tin. The 50 to drive east by two men, at 3½ per fm.; lode still disordered by the cross-course. The 40 to drive east by two men, at 4½ per fm.; lode small. We have also set 13 pitches, to 26 men, at 12s. 3d. in 11.

**EAST WHEAL GRENVILLE.**—G. R. Odgers, Wm. Bennetts, Nov. 11: The lode in the 110 east is from 20 in. to 2 ft. wide, and not looking quite so well; a patch of soft ground has come in, which has disordered the lode; but this lode being subject to such changes we take little or no notice of it, as we think and believe it will shortly improve again. The lode in the 95 east is worth 1 ton of copper per fathom, and which has a promising appearance. In the 85 the men have not yet finished stoping in the granite. The lode in the 75 east is in two parts, together producing 1½ ton of copper ore per fathom, with precisely the same features that the lode presented at the 55, before reaching to this level; we, therefore, anticipate good results here. The lode in the 65 is undergoing a change very similar to the 55. The lode in the 55 is 18 inches wide, and worth 2 tons of copper ore per fathom—a good lode; here we are putting in air-pipes, and as soon as complete we propose to put up a rise against the 45, which will be on a good lode, worth more than 3 tons of copper ore per fathom. The 45 cross-cut is now within some 5 or 6 ft. of the lode.

**EAST WHEAL KRETH.**—T. Uren: We had many difficulties in the adit, but I now hope we have overcome the worst, having let down the water to this level. The lode is put in, and the collar in the eastern shaft, and we expect in a week more to see the adit end. The old men must have had a large quantity of tin there, as we find good stones of tin among the loose stuff in clearing it.

**EAST WHEAL RUSSELL.**—W. Richards, Nov. 12: The ground in the cross-cut south, in the 130 east, is of the same character—killas and elvan, with numerous small branches crossing the end, containing quartz, peach, a little mundle, and copper ore. We are progressing with clearing and cutting abroad the level east of the Tunnel, on the course of midday lode satisfactorily, and shall get to the end as soon as possible. We shall commence to drive east of the Tunnel, on the course of the north lode, to-morrow, and I anticipate a good improvement as we advance towards and east of the cross-course. There is no change in the other points.

**EBURY.**—Wm. Kitto, Nov. 12: Our operations during the early part of the past month were confined to the sinking of the shaft below the 50, and driving the 60 end eastwards towards the swallow, prior to driving the said 50 westwards towards the ore ground in that direction. In the first-named place, we got to the end as soon as possible, and the shaft never new to be developed; the ground is hard, and the lode poor. I hope by the end of another month the shaft will be down the required depth for another level. In the 50, as before intimated, we have commenced to drive westward; the result is that we have struck into a large sough or cavity, which is fully 4 fathoms long, and filled to within a foot or two of the roof or top with clay and sand, and occasional lumps of lead ore. In the roof or top of this sough the lode is large, showing good blotches of lead in places. In the extreme west end of the sough, the lode is 2 ft. wide, and shows lead; I should think about 1 ton of lead sufficient to pay the cost of driving the level, but I cannot speak positively; we have brought the level, which is now 3 fms. behind, up to it. I should here remind you that the roof of the sough is not so high as the roof of the level, consequently we have to blast our way forward. The depth of the sough of course I cannot give you, but I think there can be but little doubt of finding ore at the bottom, as everything speaks it. On the whole, I consider our prospects are looking very encouraging.—P.S.—We have this day sold 5½ tons of lead ore, at 12s. 6d. per ton.

**GANTON COPPER.**—G. Rowe, G. Rowe, Jun., Nov. 7: Our progress in sinking King's engine-shaft is very satisfactory, which is now down 10 fms. 2 ft. 8 in. below the 70, and the ground in the present bottom is a beautiful mineralised killas. The lode in the 70, east of said shaft, is worth 3 tons of ore per fathom. The lode in the winze sinking below this level, east of cross-cut, is worth 8 tons of good quality ore per fm. The lode in the stopes in back of the same level is worth 3 tons of ore per fathom. The lode in the stopes in bottom of the same level, west of the cross-cut, is worth 4 tons of ore per fathom. The lode in the 60 east, since last reported on, has changed since last reported on. The lode in the winze sinking below the 60 east is worth 4 tons of ore per fathom. No other change in any point of operation. Our monthly settings will be to-day, particulars of which we will forward early in the coming week.

**GONAMENA.**—R. Pascoe, Nov. 10: Venning's lode at the 138 west is worth 2 tons of copper per fm. The lode in the winze sinking below the 126 is worth about 3 tons of ore per fathom. The stopes in the back of the 126 worth 4 tons of ore per fm. Gilpin's lode in the 114 east contains good stones of ore, but not enough to value.

**GREAT CWMYSMLOG.**—R. Clocker, Nov. 12: In driving Oliver's adit during the last few days the men have been taking down the south side of the level, where we find some good silver-lead ore, the lode on this side having a most promising appearance. Finding that there are veins of this rich ore on the lode so far south as we have yet gone, we think it desirable to strip down the lode still further to the south, to prove if there be not ore more towards the south wall of this great lode. In my next report you shall know how this part of the vein looks.

**GREAT NORTH DOWNS.**—Wm. Rich, Nov. 11: The sinking of Sleggan's engine-shaft below the 84 is being urged on without delay; we are sinking on the south wall of the lode, and intend to cut into it occasionally, to prove its composition. The 84, west of Sleggan's, is unproductive. The 84 east is worth 10s. per fathom. The lode in the winze below the 74, east of Sleggan's, has improved since last report, now worth 15s. per fm. The lode below the 74, west of Sleggan's, is worth 15s. per fathom. The stopes west of shaft, in the 74, are worth 14½, 12½, and 8s. per fathom. The lode at Butler's shaft, sinking below the 75, is large; the part carried is worth 5½ per fathom. The 75, east of Butler's, is worth 10s. per fathom. The lode in the bottom of the 64, and east of the 75 end, is worth 15s. per fathom. The stopes in the 64 east are worth 10s., 8s., and 6s. per fathom. The branch or lode in the 64 cross-cut south yields good stones of ore. Butler's north lode, at the shaft sinking below the 84, is worth 5½ per fathom. The 84, west of King's, is without alteration to notice. The stopes in this level are worth 10s. and 8s. per fm. We have sold the tin-stone, which reached 22s. 1s.

**GREAT RETALLACK.**—G. R. Odgers, J. Harris, Nov. 7: Setting Report: No. 1 Lode: The 30 to drive south from the shaft, by four men, at 3½ per fm.; lode 3 ft. wide, and worth 4 to 6 cwt. of lead per fathom; this is a very kindly lode. The 30 north, to six men, at 3½ per fm.; lode 15 in. wide, with good stones of lead; here the men will be engaged cutting barrow-road and plat, previous to resuming the sinking, which will take them another month. The 20 south by four men, at 2½ per fm.; lode 15 in. wide, with stones of lead. The stopes above this level, to four men, at 2½ per fm.; lode worth 4 cwt. of lead to the fathom. The winze to sink below this level, by four men, at 3½ per fm. lode 15 in. wide, with a leader of lead; we think this winze when holed will enable us to stope some lead ground. The 20 north, by four men, at 4½ per fm. lode 15 in. wide, with good lumps of lead, worth 2 cwt. of lead per fathom. No. 2 Lode: The 40 to drive both north and south, by six men, at 4½ per fm. lode 18 in. wide, of friable quartz and white iron, containing good stones of lead; these are two highly promising ends, and which from their appearance ought to make lead. At the 30 we have placed two men to strip down the side of the lode, as we are thinking the branch of lead on which the winze below the 20 is sunk, may be standing in the side. The winze to sink below the 20 north, by six men, at 6½ per fm.; there is a good branch of lead in the winze, but more especially in the north end, which will produce fully 15 cwt. per fm.—Ground excavated during October: No. 1 shaft sunk below the 20, 3 ft.; the 30 is driven both north and south 2 fms. 5 ft. 8 in.; the 20 is driven south of shaft 2 fms. 4 ft. 2 in.; winze sunk below the 20 south 3 fms. 4 ft. 5 in. The 20 is driven north of shaft 4 fms. 2 ft. 2 in.; No. 2 shaft is sunk below the 30 5 ft. 8 in.; the 40 is driven both north and south of shaft 1 fm. 5 ft. 6 in.; the 30 is driven north 4 fms. 4 ft. 8 in.; the winze below the 20 north, 3 fms. 4 ft. 2 in.—25 fathoms 3 ft. 8 in.

**GREAT RETALLACK.**—J. Harris, Nov. 12: No. 1 Lode: The lode in the 30, south from No. 1 shaft, is 2½ ft. wide, of quartz, &c., with a leader of lead on

the western side, worth 6 cwt. to the fathom. The lode in the 30 north is 15 in. wide, containing good lead, but not to value. In the 20 south the lode is 12 in. wide, of quartz and friable spar, with a little lead—a kindly lode. The lode in the winze sinking below this level is 1 ft. wide, containing good lumps of lead, saving work. The stopes above this level will produce from 4 to 5 cwt. to the fathom. In the 20 north the lode is 18 in. wide, of quartz, &c., worth 2 cwt. of lead to the fathom. No. 2 Lode: The lode in the 40, north and south, is 18 in. wide, principally white iron, with occasional stones of lead in the north end. The lode in the winze sinking below the 20 is small at the bottom of the winze, and producing little lead, but the shoot is standing to the north end of the winze for 5 ft. high, and worth 15 cwt. of lead to the fathom; as we have only a few feet more to sink to hole to the 30, I think it is better to put the winze through than to be following the shoot.

**GREAT SOUTH CHIVERTON.**—J. Nancarrow, J. George, Nov. 9: At our survey to-day the following work was set:—The 30 to drive east by six men, at 2½ per fm.; lode 15 in. wide, of quartz, &c., worth 2 cwt. of lead per fathom; a very good-looking lode, and the ground about it is highly congenial for lead. The 40 to drive east by three men and three boys, at 6½ per fathom; the lode looks better than it has for a month past. The 40 to drive west by four men, at 7½ per fathom; this end is again improving, and will yield 3 cwt. of lead per fathom, and appears to be getting into another shoot of lead. The 50 to drive west by four men and four boys, at 6½ per fathom; here we have the best looking lode ever seen in this level; it is draining the 40 very fast, and must soon get into the rich lode zone below that level. The 60 to drive east by six men, at 7½ per fathom; a very good-looking lode, 3 ft. wide, containing plenty of mundle. Our prospects throughout the mine were never so good as they are now.

**GREAT SOUTH TOLGUS.**—J. Daw, Nov. 11: In the 150 cross-cut, north of Noel's shaft, no lode has been seen as yet. In the 154, east of the cross-cut, on the tin lode, the lode is worth 19s. per fm. In the 154, west of the cross-cut, the lode is worth 12s. per fathom. No alteration in any other part of the mine. **GREAT WHEAL BARDELEN.**—R. Pryor, H. Tregoning, Nov. 7: The tin lode in the 75, west of the cross-cut, at Hill Brothers engine-shaft, is about 5 ft. wide, and still improving, being impregnated throughout with veins and spots of tin, producing good saving tinwork. The ground for driving is just the same as when last reported—its character is looking more promising. The lead lode in the 75, west of the cross-cut, is from 2 to 3 ft. wide, containing flooken, spar, mundle, and stones of silver-lead. The ground at present is improving, and appears to be more congenial for mineral.

**GWYDYR PARK.**—W. Smyth, Nov. 10: There is no particular change in the shaft at Gwydyr Park; the water still continues very heavy owing to account of the wetness of the weather. There is no alteration in the Vuchelash deep adit since last report, two of the men being employed chiefly at Gwydyr Lillion.

**HARWOOD.**—Wm. Vipond, Nov. 7: There is no change in the string or vein called Richardson's. I have taken the two men from the stopes at Trough, and put them to one of the north strings at Scar Head, going west; there is ore in the sole, and I think it well worth trying for a few days. We have got the strings on the rise at Scar Head at the bottom of the limestone; we cannot tell what it may be worth until we reach about the middle of the limestone. I shall arrange with the agent to come and see the ore weighed as soon as I can.

**HINGTON DOWN CONSOLS.**—T. Richards, Nov. 11: The lode in Bailey's engine-shaft, sinking below the 140, is much more promising, containing peach, capel, mundle, and rich stones of copper ore, and from its general character an important improvement may be expected shortly. In the 100, west of Bailey's engine-shaft, the lode is still being opened into, and is of a promising character. The rise in the back of the 85, west of Bailey's shaft, the lode contains capel, mundle, peach, and a little ore. In the 85, east of Morris's engine-shaft, the lode is producing some good stones of ore. In the adit level south of Morris's, the lode is 18 inches wide, and worth 2 tons of copper ore per fathom. In the 350, west of the sump-winze, the lode is worth 1 ton per fathom. In the 350, east of the sump-winze, the lode is 3 feet wide, and of a very promising character, but at present poor. The lode in the 310, east of No. 3 shaft, is still in broken ground, but we expect to get through it now in a few days. The stopes and pitches are looking a little better than when last reported.

**MAUDLIN.**—John Tregay, Nov. 7: We have been engaged clearing the stuff broken in the end and rise, &c., all the week, so that there is no change from last report. Next week we shall resume the rise in the ore ground, and commence stripping down the part of the lode by the side of the level.

**MINERA UNION.**—W. T. Harris, Nov. 11: Low's Shaft: The lode in the 60 yard level north is 3 feet wide, worth 8 cwt. of lead per fathom, and improving as going forward. The ground in the cross-cut at the 40 yard level consists of killas limestone. Judging from the position of the beds I think we cannot far from the lode. Strabon's Shaft: The lode in the 80 yard level is 18 inches wide, and worth 2 tons of copper ore per fathom. The pitch in back of this level south is worth 1 ton of lead per fathom. The pitch in back and north of the shaft is worth 8 cwt. of lead per fathom.—Boundary Shaft: The pitch in bottom of the 60 yard level is worth 1½ ton of lead per fathom, and very promising. The pitch in bottom of flat is worth 5 cwt. of lead per fathom. The level driving north is same as last reported; the object of this level is to unwater Low's shaft, as it will come in 20 yards deeper than the present bottom of the same shaft; good water will be obtained, and this portion of the mine placed in a good position. The ground in the big cross-cut is without change to notice.—Flue Shaft: The stopes in bottom of the 40 yard level is worth 10 cwt. of lead per fathom. The pitch in back of this level is worth 5 cwt. of lead per fathom. The dressing is progressing as usual.

**MOUNT GABRIEL.**—Nov. 2: During the past month the level has been extended 4½ fathoms, and there is now about 9 fathoms of ground opened on the course of the lode from the 30 fm. level cross-cut; no portion of this ground has been without indications, more or less strongly developed, of a good lode, and since last reported a branch of baryta, 6 in. wide, has fallen into it, but the end does not show any immediate prospect of any more favourable change. The flooken still continuing against the wall affords some freedom in driving; set on Saturday at 5½ per fathom. I should much wish to push out the driving to intersect this lode from the 20 fm. level cross-cut, as before recommended, about 5 fathoms ought to do this, and it would at once throw great light on the sub-level. We have had the level cut with a greatly increased flow of water, and it is impossible to keep it in fork and draw the stuff with the usual machinery.

**NEW DEVON CONSOLS.**—Nov. 10: Trewellack Mine: I was all through the mine yesterday. The engine-shaft is being sunk in a clean beautiful killas; I calculate on the men sinking more than 3 fms. this month. The ground in the new or flat-roof shaft is pretty easy; I calculate on sinking from 4 to 5 fms. this month, so we shall soon get down for a 10 fm. level; the lode is small, but yielding some beautiful stones of lead; we are not yet carrying down all the lode. The part on the north end is good for lead we are leaving it until we get down a little deeper, and then put in the collar to break it; it is not so large, but very good work, on the whole, looking very promising, and the new 6-in. lift keeping out the water very well. The lode in the 20, at the engine-shaft, is not so good as when I wrote to you last; when it was first cut there was a pretty lode for about 15 in. wide, 6 in. solid lead, which is now to be seen in the back and bottom of the level. The full size of the lode is from 5 to 6 ft., and the end is spotted with lead; it is a strong fine-looking lode, although poor at present. I consider we are part on a fair way of proving the mine. The pitwork is all fixed and in good order, and the two shafts at the 20 are being put on with large wheels. The l



west, on the south lode, is at this time poor. The same may be said of the 50, both east and west, on the same lode. No. 1 stop, west of Phillips's rise, is worth 82, per fathom; No. 2, east of ditto, 107, per fathom. Five pitches in all are working at an average tribute of 8s. 6d. in 17. We have commenced to stamp from Peever, and in the course of a very short time we shall be able to submit to the committee our opinions as to what we shall further recommend being done in this portion of the mine.

**NORTH POOL.**—J. Vivian and Son, F. Clymo, Nov. 12: Ballarat shaft is now 4 fms. under the 40, where the lode is 5 ft. wide, presenting a very favourable appearance, and producing some good copper ore. The stopes in the back of the 40 continue to produce 2½ tons of copper ore per fathom, and the ore ground lengthening westward. We sold to-day 24 tons of copper ore (the parcel having been computed to be 21 tons, and so called in the Ticketing paper), which has realised 5s. 11s. 6d. per ton, making 1334. 16s.

**NORTH REALLACK.**—G. R. Odgers, J. Harris, Nov. 7: We have to-day set the 20 to drive north from the No. 1 shaft by six men, at 2s. 2s. per fm.; lode 15 to 18 in. wide, of quartz, with good stones of lead embedded in a very congealed matrix.

**NORTH ROSKEAR.**—J. Vivian and Son, Nov. 12: In Pearce's shaft we continue to sink through a good course of copper ore, the lode being 6 feet wide, and worth 40, per fathom. In the winze sinking under the 205, west of Pearce's shaft, there is also a good lode for copper, being worth 35, per fathom. There is nothing new to remark on in the 205, east and west of Pearce's shaft, the lode opening into the ground under the 205, west of Doctor's shaft, the lode produces tinstone of a good average quality, and is worth about 25, per fathom. The tin stopes generally are producing tinstone of a low average quality, but combined with a large proportion of arsenic, which now realises a much better price than we have had for some years until very recently. We are driving the 24 east in the Wheal Crofty or eastern part of the set, through a lode 2 feet wide, producing some good copper ore, and presenting a promising appearance for that ore. Our parcel of copper ore sold to-day has realised 5s. 8s. 6d. per ton, amounting to 461. 2s. 6d.

**OLD GUNSLAKE.**—W. C. Cock, Nov. 11: We shall complete the collar of Parker's shaft to-morrow, when we shall at once put in penthouse in the 45, and prepare for sinking as fast as possible. No alteration in the cross-cut north; ground good for driving. The cross-cut south in the 91, with all other work at Michael's, is being suspended, except that of sending up the tributors' work, which we are now engaged about.

**PENHALE UNITED.**—R. Pryor, H. Bennetts, J. Pryor, Nov. 12: The lode in Phillips's engine-shaft, sinking below the 90 fm. level, is very much improved, and is 2 ft. wide, worth 10 cwt. of lead per fathom. The rise in the back of the 90 fm. level, north of shaft, is worth 5 cwt. of lead per fathom. We have suspended the driving of the end north until the rise is communicated to the level above, for ventilation. The lode in this level, south of shaft, is worth 3 cwt. of lead per fm., and likely to further improve. The men are making fair progress in clearing and securing the 80 fm. level, north of Hall's shaft; the level is still full, but all the stuff that is coming out of it will pay well for dressing, and we are daily expecting to reach the end, after which we shall drop the lode to the bottom of Hall's shaft (90). We have put the two boilers of the pumping engine in thorough repair, and all our machinery is in good working order.

**PENHALE WHEAL VOR.**—Wm. H. Martin, Nov. 11: We have fixed the lift in the engine-shaft, and the men are now in regular course of sinking below the 94. In both the cross-cuts north and south at the 94 the water is gradually increasing, and I am daily expecting to cut the lode. Penhaile Lode: The men are making good progress in sinking Ritchie's shaft below the 60; no lode taken since last advice. No alteration to remark in the 60, west of shaft, the lode is worth 10, per fathom. A lode 20 cwt. of lead per fathom is being taken in the 70, west of shaft, the lode is worth 10, per fathom. The 60, south of shaft, the lode is worth 10, per fathom. The 55, east, on new lode, is worth 8, per fathom. The 50 cross-cut north is still without any lode; ground good. The 45, east, on new lode, is worth 7, per fm. Both the 44 and 40 west, on Pink lode, produces some tinstuff, but not to value. Pink Mine: The Shop shaft, below the 80, is in a large and very promising lode, worth 10, per fathom. The 70, east, on the 55, east, the lode is worth 10, per fathom; and the 20, west, on same lode, 10, per fathom.

**PRINCE OF WALES.**—J. Gifford, W. Gifford, Nov. 10: There has been no lode taken down in the 65, east or west, since our last report. The men have been engaged fixing a 9-inch plunger-pole in the bottom, at the 45, in place of a 7-inch one, and which is working very satisfactorily, and we hope to have the water in fork to the bottom by the latter part of this week. In the 55 east we are driving by the side of the lode. In the stopes in the back of the 55 east the lode is worth 30, per fathom. In the winze in the 55 east the lode is worth 10, per fathom for the south part, which we are carrying. In the 55 west the lode is 2½ feet wide, yielding saving work, but not to value. In the cross-cut south, in the 55 west, the supposed new lode is 1 foot wide, composed of capel, quartz, and muddle, with occasional stones of ore intermixed. In the stopes in the back of the 55 west the lode is worth 18, per fathom. In the stopes in the back of the 45 west the two lodes are together worth 20, per fathom. The supposed new lode, west of cross-course, in the 45 west, is worth 15, per fathom. No change in any other part of the mine.

**PROSPER UNITED.**—J. Hall, F. Bennetts, Nov. 12: The lode in the 100, west of Hand's shaft, is 3 ft. wide, worth 10, per fm. The 90, west of Hand's, is producing stones of copper ore. The 90 east, on Gwallon lode, is worth 31, per fathom. The 80, west of Hand's, is suspended; about 6 ft. behind the present end we have intersected one of Gwallon north lodes, worth 12, per fathom for copper ore. The 80 east, on Gwallon lode, is worth 8, per fm. for copper and tin. The stopes in the back of the 80, west of Hand's, are worth 7, per fathom. The winze sinking below the 70, east, on Gwallon lode, is worth 31, per fm. The winze sinking below the 60, on Pope's lode, is producing a little tin. The 60 west, on Pope's lode, is worth 2, 10s. per fm. The stopes in the back of this level are worth 5, per fm. The winze sinking below the 50 west, on Pope's lode, is worth 3, per fm. The stopes in the back of this level are worth 7, per fm. The 40 west, on Pope's lode, is worth 3, per fm. The stopes in the back of this level are worth 5, per fm. The 30, east of Louisa's shaft, is poor. The 70, west of cross-cut, east of Louisa's, is worth 2, per fm. The 60, west of cross-cut, is worth 4, per fm. The stopes in the back of this level are worth on an average 7, per fm. The 80, east of Hosking's, is worth 5, per fm. The winze sinking below the 70 is worth 4, per fm. In the 70 cross-cut south, at Hosking's, we have intersected some branches of copper ore, but not to value. We are still driving the cross-cut south. The lode at Murchison's shaft is producing stones of ore, but not enough to value.

**REDMOOR.**—Thos. Taylor, Nov. 11: We are busy engaged in raising stone, and clearing out foundation for furnace, water-wheel, &c. There is no part of the furnace underground. We are now driving on the side at the 25 east; the ground is soft. The 25 west is yielding some good tin-work. We have suspended the 12, east and west, and the stopes in the back of the 25, until we get more burning power, which will be erected as soon as possible.

**ROARING WATER.**—H. Thomas, Nov. 10: The lode in the end west from north cross-cut is improving in character and appearance, and I expect soon a good change will take place. I see no particular change in the south counter—a very kindly lode. In the south cross-cut the ground has taken a sudden dip south, and large streams of water flowing from the end; I expect an important change in this direction, as the rock is now thickly mixed with strong yellow copper ore.

**ROSECLIFF AND TOLCARNE.**—R. Pryor, Nov. 11: The lode in the 50 fm. level, driving east of Lindo's engine-shaft, is 2½ ft. wide, producing good stones of lead, and the end is letting out a quantity of water. The ground in the 30 cross-cut, driving north of shaft, is still favourable for driving, and we think it is nearing a lode or branch.

**SNAPEL.**—H. Jones, Nov. 9: The lode in the shaft is without any particular change to notice since last report; the character of the ground is harder and more favourable for the production of ore in depth; the speed of sinking is about 2 fms. a month. The 60 south is not driving at present. In the 60 north the ground is much harder; lode also hard and increasing in size, more mixed with spar, producing occasionally a little lead and blende, but not yet enough to value; the appearances are decidedly more favourable as we advance, and specially encouraging, seeing that we have a good lode in the 40 sump, beyond this level. In the 50 south we are stopping on a lode worth about 14, per fm. The 40 end north, no change to notice. The lode in the 40 sump is a little less in size, now about 1 feet 6 in. wide, but richer for lead and blende as we sink. The stopes at the 20 are looking very well, and improved since last report. We are now stopping in the old workings, where we find a rib of ore 2 ft. wide, very good for lead; if this should lengthen in sinking it will greatly assist our ore raising. The lode and ground in the south adit are about the same in appearance as they have been for some time. The crushing-mill and washing-floors are now newly completed, and we shall soon be ready for dressing.

**SORTRIDGE CONSOLS.**—R. Jackson, Nov. 12: In the 152, east of the engine-shaft, the lode is 3 ft. wide, composed of spar, capel, muddle, and good stones of copper ore, but not to value. There is no change to notice in any other part of the mine.

**SOUTH CONDURROW.**—J. Vivian and Son, W. Williams, Nov. 7: In the 93 we are making good progress in driving south on the cross-course, east of King's shaft, not having yet reached the tin lode. In the 32 south, west of King's shaft, we are meeting with branches of tin capel, containing tin, which are dipping south towards the lode. In the 72, cross-cut south, west of King's shaft, we have not yet got into the main part of the lode, but the tin capel through which we are passing is of good quality, being thickly traversed by veins and seams of tin. In the 61, west of King's shaft, we have cut completely through the lode from the stope to the level, which we have been driving east to the south wall, and find the lode at this point 4 fms. wide, composed of tinstone of good quality, being in fact better than we have before seen it. In the western end of this level which has been driving by the side of the lode, on the south wall, we shall now proceed to cut through the lode. In the 51, cross-cut south, west of Vivian's shaft, we have driven 10 ft., and intersected a branch about 3 in. wide, containing yellow copper ore; we shall continue this cross-cut further. At the large stamps we have now 16 heads at work, and shall shortly have 20; and have 6 heads at work at the small stamps. We find the tinstone turning out equal to our expectations.

**SOUTH WHEAL GRENVILLE.**—G. R. Odgers, Wm. Bennetts, Nov. 7: The men are getting on as fast as they possibly can with the sinking of the engine-shaft, but there is no change since our last report.

**ST. JUST AMALGAMATED.**—R. Pryor, Wm. White, R. Wearne, Nov. 10: Phillips's engine-shaft to sink below the 50, by six men, at 8s. 5s. per fathom, in a lode 2½ feet wide, producing good stones of tin. Saveall's Lode: The sinking of Saveall's engine-shaft is completed to the 110, and we have set the 110 to drive east and west of shaft, by six men, at 4s. 15s. per fathom, in a lode worth 5, per fathom. The 100 to drive east of shaft, by two men, at 3s. per fathom; lode worth 4, per fathom. The 130 to drive west of shaft, by two men, at 7s. 5s. per fathom; lode worth 5, per fathom. The 90 to drive west of shaft, by two men, at 7s. 7s. per fathom; the lode is worth 4, per fathom. Owl Lode: The 40 to drive north of Reddipper shaft, by two men, at 7s. 6d. per fathom; lode worth 4, per fathom. The 20 to drive north of shaft, by two men, at 6s. 15s. per fathom; lode worth 7, per fathom. The 10 to drive north of shaft, by two men, at 4s. 15s. per fathom; the lode at this point is disordered for the present by a flood. The 10 to drive north of shaft, on a branch, by two men, at 4s. 15s. per fathom; the lode worth 6, per fathom. The winze to sink below the adit level, on ditto, by four men, at 4s. 10s. per fathom; lode worth 7, per fathom. The 20 to drive east of Reddipper shaft, by two men, at 3s. 10s. per fathom; lode worth 4, per fathom. The 60 to drive west on Pryor's lode, by three men, at 3s. per fathom; lode worth 6, per fathom. We also set 47 tribute pitches to 125 men, at tribute varying from 5s. to 15s. in 14. Our pay and setting went off very satisfactorily.

**SUMMER HILL.**—Wm. Wasley, Nov. 12: I have set Wynne shaft to eight men to sink 4½ yards, which will make it 40 yards below surface, at 80s. per yard; the men to pay all costs. I am glad to say that the flat in the end driving east on the new ore course is taking a drop, which is a very favourable indication for the production of ore. The ground is also easier for driving, therefore very good progress is being made. The ground and fire in the south-west level, driving towards Wynne shaft, is without any alteration to notice since my last report.

**TREWE.**—Nov. 10: We have cut the lode at the 29; it is cut into about 4 ft. and no sign of any under wall yet; it is a strong lode, nearly all muddle, and very spare for driving. It is not unusual to see plenty of muddle, in places, in the best of lead mines in the Perran district. The ground in the engine-shaft is very good. We went all through the adit yesterday to look at the lode; it is a fine strong lode, with a little muddle and spots of lead.

**VIGRA AND CLOGAU.**—Wm. J. Holman, Nov. 12: A little visible gold has been broken from the stope east from No. 6 shaft; the lode is 6 feet wide, and some parts of it look well. The lode in the end, being driven west from same shaft, is 5 ft. wide, and of the usual quality. In the end east of No. 1 shaft, the lode is 4 ft. wide, and still rather poor. The men from No. 5 stope are yet engaged at winding water and stuff from No. 5 shaft. At the Old Clogau Copper Mine the sinking of the incline shaft is being continued as usual in dead rock, as the driving of Jenny's adit, at Vigra Mine. The boys from the reduction works are employed on the mine-sucking quartz. A lift of pumps is being prepared for No. 6 shaft, and when put in will effect a material saving in the water cost at that place. I shall be able to forward you a bar of gold next week.

**WEST DEVON CONSOLS.**—J. Riekards, Nov. 11: In cutting in north at the engine-shaft for the purpose of making bio-plat, as I advised you, we met with a branch producing lead ore a very promising feature; this coupled with the fine character of the lode where seen at all points of operation, and the good stones of ore, leads me to believe, that it cannot fail to have a fair trial of becoming lead ore good mine. Soon after the erection of the steam engine good results are anticipated, and the engine purchased being a very good one will much facilitate our progress.

**WEST DRAKE WALLS.**—T. Gregory, Nov. 11: In the 40 fm. level cross-cut south we have an increase of water, and the ground is more favourable for driving. There is no change to notice in the 40 fm. level cross-cut north, in which good progress is being made.

**WEST PRINCE OF WALES.**—W. C. Cock, Nov. 11: We have no change in the mine since my report for the general meeting. The new lift at the south engine-shaft answers well, and the shaft is again in full course of sinking.

**WEST WHEAL TREMAYNE.**—S. Roberts, Nov. 11: In the 32 end west the lode is 10 in. wide, and producing good stones of ore. We have now two men and two boys in this end; the six men who were in this end with two others we have put back to cut a plat, and to make ready for sinking; we shall have to fix some of the pitwork previous to sinking. The 20 west, on the engine lode, is much the same as last reported. No alteration this week in the tribute pitches.

**WHEAL COURTNEY.**—J. Gifford, Nov. 11: In the 20 west the lode is still large, and worth full 8, per fathom. No other change.

**WHEAL FULLER.**—J. Inch, J. Brown, Nov. 11: Stevens's Shaft: In the 92 east the lode is 4 ft. wide, producing tin, but not to value. The stope in the back of this level is worth for tin 9, per fm. The stope under the 80, west of the shaft, is worth 6, per fm. The 60, driving east of this shaft, on the north lode, is producing 1½ ton of copper ore per fathom. Hocking's shaft, sinking under the 80, is down nearly 10 fms.; the lode in this shaft is producing good stones of copper ore and tin, worth for the latter 12, per fm. The 80, driving west of this shaft, on Stevens's lode, is producing some good tin for tin. The stope in the bottom of the 70, west of this shaft, on the north lode, is worth for tin 15, per fm. The stope east of this shaft, on this lode, is worth for tin 10, per fm. The stope under the 60, west of Knuckey's winze, is worth 10, per fm. The stope east of this winze is worth 12, per fathom. The stope east of this is worth 12, per fm. No other change in the mine to notice.

**WHEAL FRIENDSHIP.**—Nov. 9: Bennett's Lode: At the 170 fm. level, west of the flood-course, the lode is 1 ft. wide, unproductive. The lode in the 150, west of Whitburn's cross-cut, is 4 ft. wide, producing 1½ ton of ore per fm. The lode in the rise in back of this level is 5 ft. wide, producing 4½ tons of ore per fathom, for length of the rise (10 ft.). Caroline's shaft is 9 ft. below the adit level, and the ground still continues favourable for sinking. We have no change in either of our cross-cuts.

**WHEAL GRENVILLE.**—G. R. Odgers, Wm. Bennetts, Nov. 7: No lode has been taken down in the 140 west since our last. The lode in the 130 west is 4 ft. wide, and worth 9, to 10, per fm.—a pretty lode. The lode in the 120 west is 3½ ft. wide, and producing good tin, worth 12, per fm. We have a pretty lode in the back of the 66, west from the north shaft, worth fully 15, per fm. No lode has been taken down in the 66, west from the new shaft. The lode in the 54 west is 15 in. wide, and worth 6, per fm. The lode in the 42 west is worth 8, per fm. All the other places are looking much the same as last reported.

**G. R. Odgers, Wm. Bennetts, Nov. 12:** The lode in the 130, west from the new shaft, is 4 ft. wide, and producing a little tin, a kindly lode. The tributors are working spiritedly, and they are breaking about their usual quantity of tin.

**WHEAL KITTY (St. Agnes).**—S. Davey, Wm. Polkinghorne, Nov. 7: In the 82, driving west of Holgate's shaft, the lode is 4 ft. wide, but not so good for copper as when last reported, now worth for copper and tin 12, per fm.—New Shaft, Pryor's Lode: In this shaft sinking below the 94 the ground during the week has changed a little for the better. In the 94, driving east of shaft, the lode is 2 ft. wide, and worth for tin 16, per fm. In the 94, driving west of shaft, the lode is 5 ft. wide, and worth for tin 17, per fm. In the 82, driving east of shaft, the lode is worth for tin 18, per fm. In the 82, driving west of shaft, the lode is worth for tin 18, per fm. In the 65, driving west of shaft, no change has taken place during the week. In the winze sinking below the 65, west of shaft, no lode has been taken up since our last report.—Caunter Lode: In the 82, driving north of shaft, the lode is yielding good work for tin.—Vottle Lode: In the 24, driving east of cross-cut, the lode is producing a little tin, but not to value.

**WHEAL UNY.**—S. Coade, M. Rogers, Nov. 7: There is no change of importance to report on this week. The ends and stopes are of the same value as last week. We shall sell a parcel of tin on Saturday next.

## FOREIGN MINES.

**CHONTALES GOLD AND SILVER MINING COMPANY.**—The directors have received most satisfactory advices from Mr. Belt, under date Oct. 7. The various works at the mines are progressing with the utmost dispatch, and the mines are being opened out with great energy. The lode in the deep adit level, at Chontales, is 6 ft. wide, and worth 10, per fm. Mr. Belt's estimate for the year ending August, 1869 (September gold received by this mail), exceeds the amount stated in his last report. Gold remitted, 526 ozs., from 1400 tons of stuff, of which 1370 is from the 12-head stamps, and 30 from the arrastras; average produce, 7½ dwts. per ton of ore. The health of the establishment is good.

**Consuelo and Estrella.** No. 1 stope in the back of No. 3 level, west of No. 3 pass, has been stopped 6 varas; lode 4 ft. wide, worth 1½ oz. of gold per ton. No. 2 stope in back of the same level, east of No. 3 pass, has been stopped 6 varas; lode 3 ft. wide, worth ¾ oz. of gold per ton. This stope is a piece of lode that was left standing in the south side of the level. No. 1 stope in back of the No. 2 level, east of No. 2 shaft, has been stopped 12½ varas; lode 4 ft. wide, worth 1½ oz. of gold per ton. No. 2 stope in the same level, east of No. 2 shaft, has been stopped 12½ varas; lode 4½ ft. wide, worth ¾ oz. of gold per ton. No. 3 stope in back of the same level, east of No. 2 shaft, has been stopped 28 varas; lode 4 ft. wide, worth 1½ oz. of gold per ton. This stope is a piece of lode that was left standing by the former level, having taken away the south, which was best, and left this piece at the north. No. 1 stope in back of No. 2 level, east of No. 1 shaft, has been stopped 8 varas; lode 4 ft. wide, worth ¾ oz. of gold per ton. No. 2 cross-cut, to intersect No. 2 level, and ventilate No. 3 level, east of No. 2 shaft, has been driven 19 varas, and in this cross-cut a tramway will be laid down in a few days, in order to take ores from the above workings. No. 4 deep adit level, on course of the lode, has been driven 12 varas, with a lode 6 ft. wide, averaging from 3 to 7 dwts. of gold per ton. A tramway is laid down in this level, and connected to the road which leads to the mill. This will enable us to take our ores direct to the mills. The lode here, in this point, is the largest that I have seen in these mines, although not very rich as yet, but I have every hope that before long it will be very productive, and now we can raise a good supply of quartz from this place alone. Sinking Cook's shaft to communicate with No. 4 level 14 varas; no lode in this point as yet, but I expect to meet it within a few days from the south side. Rising in back of No. 4 level 8½ varas, and from this rise we shall commence our stopes, worth about 3 dwts. per ton. One Englishman and five natives have been employed for the last month repairing No. 2 level, east of No. 1 shaft. Two-thirds of this level has fallen together in consequence of the late rains, but I hope to complete it in a few days. We use no other timber now but Nispero, although it is very expensive, but cheaper than any other. Our stoping is very difficult indeed, on account of the rains coming down through the mines, which we cannot prevent. The tramming for the past months has cost 20 cents per ton. To bring it lower than this I cannot see my way clear. Our mines at present are more favourable for giving a better supply of quartz than I have seen them before for the last six months; 402 tons have been sent to mill, averaging 12 dwts. of gold per ton from the mines, and 405 tons from old heap, worth 4 dwts. of gold per ton. From the above ores I estimate 322 ozs. of melted gold.

**San Domingo Mine.** During the past-month operations have been carried on both in and outside of the mines with all speed. No. 3 level has been driven through broken ground the distance of 7 varas, yielding 12 dwts. of gold per ton of quartz. I have not been able to get on as fast as I anticipated, in consequence of the heavy nature of the side of the lode. Judging from present appearances, the walls of the lode appear to be much firmer. No. 1 stope, in back of No. 3 level, has been stopped 8 varas, yielding 5 dwts. per ton; the lode is 3 ft. wide. No. 2 stope, in back of No. 3 level, has been stopped 3 varas, yielding 3 dwts. of gold per ton. This stope has not reached the rich pillars in the old mine, and the quartz being too much mixed with clay is the cause of its not being of more value. No. 3 stope, in No. 1 level, east of Palma's shaft, has been stopped 11 varas, yielding 7 cwt. of gold per ton; the lode is 3 ft. wide. No. 4 stope, in back of No. 1 level, east of Palma's shaft, has been stopped 9½ varas, yielding 7 dwts. per ton. This stope has been all stoped to surface, and filled in with waste dirt. No. 1 stope, west of Palma's shaft, has been stopped 10 varas, yielding 6 dwts. of gold per ton; the lode is 3½ ft. wide. No. 2 stope, in back of the same level, has been stopped 6 varas, yielding 6 dwts. per ton; the lode is 3½ ft. wide. No. 3 stope, in the back of the same level, has been stopped 3½ varas, yielding 6 dwts. per ton; the lode is 3½ ft. wide. No. 1 stope, in the back of No. 1 level, west of San Domingo shaft, has been stopped 7 varas, yielding 7 dwts. of gold per ton; the lode is 5 ft. wide. San Benito deep adit level has been driven during the past month 2½ varas, through a large, hard lode, yielding a little gold, but not sufficient to value. West San Benito tramway is getting on well. I hope by the end of the present month it will be near its completion. The shaft at West San Benito has been communicated with the deep adit level. During the past month 329 tons of quartz have been sent to mill from the mines, yielding on an average 9 dwts. of gold per ton.

**San Antonio Mine.** During the past month the working operations of the mine, both in and out, have been carried on with all possible speed. The winze in the bottom of No. 2 level has been sunk 11 varas, through a hard, poor lode. Samples have been taken and washed daily; I found them to give about 3 dwts. of gold per ton. I took a sample on Saturday from the intermediate level east of shaft; it will give 3 dwts. of gold per ton. The intermediate level, west of shaft, I cannot get into as yet, but I have the men spilling through the shaft in order to get into it as soon as possible. I have also taken two samples, one from the level west of shaft, in the deep adit level, which yields 2 dwts. of

gold per ton, the other from the level east of shaft; I find it will give about 1 dwts. per ton. The clearing up of old San Antonio shaft is still kept on. I hope to get down to No. 1 level in a few days, when I shall commence stoping at once. I think that the quartz from here will give 5 dwts. per ton. During the past month I have sent to mill from here 262 tons of quartz, yielding on an average 5 dwts. of gold per ton of quartz.

**Stamping and Grinding.** During the month the 12-head stamps have crushed 1370 tons of ore. The stamps and engine are undergoing trifling repairs, but at the end of two days we shall be ready to stamp the arrastras ground about 30 tons of ore. Two cups will be ready in a few days with drag-stones attached, in order to grind the blanket savings and quartz for the coming month. Gold produced from 1400 tons of ore 536 ozs.

**JAVALI.**—The directors have received letters from the manager and mining engineer of the mine, dated Sept. 30, of which the following is a synopsis:—The underground workings were progressing with greater rapidity, the rock in "Pim's tunnel" having become softer; Mr. Sohns expected it to connect with the Nispero by the end of November. Pollock's tunnel had been driven 8 yards nearer to the Socorro, and was almost in communication with it; the rock in the last part of this tunnel had become harder. Col. Maury says, "The workings, as usual, have not failed to bring to light excellent rich clays, which heretofore were unknown. A very fine clavo has been met with in the winze which is now being sunk to connect the 6th level of the Socorro with Pollock's tunnel; it is broad, rich, and doelle, and, besides containing a large ley of gold plainly visible to the naked eye, it is most beautifully rich in silver." The health of the men continued perfect. The titles to the land denounced were expected to be received in a few days. The small turbine continued to work well, though not able to drive the full number of stamps erected. The gold remitted is 252 ozs., derived from 850 tons, in a run of 23 days. The month's cost-sheet showed already a reduction of over \$1000. Col. Maury speaks in high terms of the value of the services of Mr. Sohns, the mining engineer, and Mr. Simpson, the engineer in charge of the mills, who constructed, also, the battery of the second 10-head stamps. He writes of these gentlemen:—"The former (Mr. Sohns), your own selection, is, perhaps, better known to you than to me; I have found him ever active and zealous for the company's interests, and in their service; and in the performance of his own duties, clever, intelligent, and able, and always ready and willing to lend a hand wherever he could be of service. I doubt if you could find a reduction officer better suited to the circumstances by which we are surrounded here, or better qualified to manage works of this class, however large and extensive, than Mr. Simpson; added to this he is an admirable machinist and mechanic, and has proved by actual test that in the building and construction of quartz mills, at least, he is a master. In addition to these qualifications he is a clever miner, and speaking the language perfectly, and an understanding of the people well and being liked by them in turn, I do not believe that the company could anywhere secure a more capable or better able to serve them than he is. I do not think that you can value the services of these two officers too highly."

**EL CHICO.**—Oct 8: In reply to the recommendation contained in your last to follow the course most likely to bring us into ore sooner, I would remark that I entertain no doubt whatever as to which this course should be, now that the "planes," or bottoms, of the old and rich mine of El Torno have been left dry by our deep adit, which has been driven sufficiently near to the old mine above us to drain it, but without intersecting the principal vein as yet. As I have before remarked, I think the rich silver ore left in El Torno can be reached sooner by clearing up the shaft, for which purpose I have had workmen already employed during the past week in forming the winze round, and in preparation to put in the staircase, also the people well and being liked by them in turn. We have also been cutting some ground in the south side of the shaft, in order to give it uniform direction from the surface down to the present level of the stuff, which is about 152 varas. This will probably occupy less than three weeks. I am happy to say the supply of ore to the hacienda has considerably increased.

**UNITED MEXICAN.**—Guanajuato, Oct. 4: Mine of Jesus Maria y Jose. The works are in much the same state as when I last wrote. The accounts for September are not yet made up, but I am glad to be able to announce to the board that we shall have a good surplus on the quarter ending Sept. 26. The silver duties having been reduced from 3½ to 3¼ per cent., the reduction in duties on the produce of Jesus Maria is equivalent to \$700 per month.—Mines in the Guadalupe de la Oscura District: In Encinillas there is an improvement, and more workmen are coming in. The destajo (contract work) going from El Oro towards Encinillas, on the lode, though not in ore, looks favourable. The buscones are throwing down some fair ore in the planes (deepest workings) of El Oro, and from present appearances we hope the quantity may increase.

**IMPERIAL SILVER QUARRIES.**—Lewis Chalmers, Oct. 5: Having encountered a seam of very unmanageable rock, only 7½ feet were made last week. I am in hopes, however, to-night's shift will put us through it.

Oct. 12: Nine feet of tunnel were made last week.

**RHENISH CONSOLS.**—Geo. Sweet, Nov. 4: Bliebach: The driveage west, on the middle lode from the cross-cut, in the 10 lachter level, is still looking well, and is rapidly hastening on this end towards Christian. We hope to lay open a great quantity of profitable ore ground. We have intersected a lode in the cross-cut, and brought to the surface some splendid stones of lead ore, but the water is so much increased that we are obliged to fix a larger pump in the shaft than the one hitherto used—3½ in., now a 5 in., and in a short time we hope to show on the surface a good pile of rich lead ore. In October month there was extended at Bliebach, in levels 7-4, in cross-cuts 2-3; at Christiana, in levels 2-2, in engine-shaft 7; at Madonna, in cross-cuts 4-16 lachters.

**ANGLO-ITALIAN.**—Mr. Pearson Morrison reports—General Operations: Levels Frisa and Poete have considerably improved since my last, having cut in sinking a winze in the former a good bunch of ore, yielding some 4½ tons per fathom. Level Pozzetta has likewise produced some very good mineral; the lode is 4 feet wide, and the water for the present we have not needed, it being necessary to open out some new ground, so as to give a large scope for operations. The various cross-cuts have advanced fairly, and I am glad to say that in the Santa Barbara (the most important of all) small seams of ore have already been met with—in fact, throughout everything looks well. The mills are now finished, and only await a few trifling alterations in setting them to work, also the large crushing mill; besides, as mentioned in my last quarterly report, a most substantial and effective water-course has been completed.

**LAGUNA.**—J. R. Rule, Sept. 28: The sinking of the shaft continues, and on Sept. 19 the total depth reached below the 75 vara level was 10,37-100 varas. The composition of the vein is sparry, with pyrites intermixed, and spots of ore. We have many varas of hard vein seen at the surface, with some pinatas of ore to the northward of the shaft, which part of the vein it would not be able to prove by a cross-cut at the depth of 100 varas. From the produce of the labour worked by the valadores we have at present accumulated about 60 cargas of azogue ore, which I purpose shortly to forward to the hacienda of San Pascual for reduction. I take due note that it is the wish of the directors that an inspection of the Laguna Mine and vicinage should be made by Mr. John Sewell, of Real del Monte, and I beg to assure those gentlemen that I shall have great pleasure in facilitating as far as possible such inspection, and in hearing from Mr. Sewell any suggestion he may think proper to make in regard to the subject of his inspection. I would further state that I have received from Mr. Sewell on the subject, but owing to my absence in El Chico, not in time to consult with him previous to this packet leaving, but expect to be able to do so in the course of a day or two.

Oct. 8: In the sinking of the Laguna shaft there has been no alteration of importance during the last fortnight, about 1 vara has been sunk. Particulars in my next. Approximate total below the 75 vara level 11 37-100 varas, or nearly 86½ varas from surface. I have seen Mr. John Sewell, of Real del Monte, on the subject of his inspection, and it appears likely that he will be able to accomplish this during the present month.

**PESTARENA UNITED.**—T. Roberts, J. Mitchell, T. Warne, J. Roberts, Nov. 3: We remit this day to the office 475 ozs. 16 dwts. 19 grs. of gold in six ingots, obtained from the three districts in the month of October from 668 tons of ore. The amalgamation at Pestarena was 115 tons, which produced 3,307 grammes of amalgam; and 93 tons of more inferior Pestarena ore, amalgamated at the Battiglio establishment, produced 18,624 grammes of amalgam, together 54,931 grammes obtained from the Pestarena district. The amalgam obtained from the ore amalgamated at Pestarena yielded 167 ozs. 16 dwts. of gold, and the Pestarena ores amalgamated at Battiglio yielded 88 ozs. 17 dwts., amounting together to 256 ozs. 13 dwts. The ore amalgamated at Pestarena shows a produce of 9 dwts. 4 grs. per ton, and the Pestarena ore amalgamated at Battiglio gave 9 dwts. 3 grs. per ton. The ore treated at Battiglio from Battiglio mines during the past month was 125 tons, and the amalgam obtained 13,535 grammes, that yielded 55 ozs. 5 dwts. 14 grs. of gold, an average of 9 dwts. 8 grs. of gold per ton. At the Val Toppa establishment we have treated from the Val Toppa Mine 335 tons of ore, and obtained 24,291 grammes of amalgam; the same yielded 160 ozs. 18 dwts. 5 grs. of gold, an average of 9 dwts. 14 grs. of gold per ton. During the first seven days of last month Battiglio, Val Toppa, and the greater part of the Pestarena amalgamating machinery was idle, on account of the damages done by the floods in the Anza, of which notice has been forwarded to the office. We hope to finish repairing the last dam to-day, and start 50 more mills. We have built a strong wall around the outer part of the old pumping-wheel, the roof will be put over the wheel this month; we have also blasted up many large rocks in the Anza, and turned the water off from the



The Market for Mining Shares on the Stock Exchange has been active during the week, with a large business. Don Pedro and Rossa Grande shares have been in special request, at enhanced prices. At the meeting of Don Pedro, on the 24th inst., the directors will recommend the payment of a dividend of 3s. 6d., instead of 3s., on account of the yield for September being larger than was expected; they close  $3\frac{1}{2}$  to  $3\frac{3}{4}$  prem. St. John del Rey, 17 to 18; Rossa Grande,  $\frac{1}{2}$  to  $\frac{3}{4}$  prem.; ditto, paid-up,  $1\frac{1}{2}$  to  $1\frac{1}{2}$ ; Anglo-Brazilian, 1-16th dis., to 1-16th prem.; Pestarena,  $1\frac{1}{2}$  to  $\frac{1}{2}$  dis. A considerable business has been done in General Brazilian shares, at 1-16th to  $\frac{1}{2}$  prem. Chontales,  $2\frac{1}{2}$  to  $2\frac{1}{2}$ ; Anglo-Italian, par to  $\frac{1}{2}$  prem.; United Mexican,  $1\frac{1}{2}$  to  $2\frac{1}{2}$ ; Frontino and Bolivia,  $\frac{3}{4}$  to  $\frac{3}{4}$ ; Port Philip,  $1\frac{1}{2}$  to 2; Taquaril, par to  $\frac{1}{2}$  prem.; Central American,  $\frac{1}{2}$  dis. to par; Capula Silver,  $\frac{1}{2}$  to  $\frac{1}{2}$  dis.; Yudanamatuna, 2 to  $2\frac{1}{2}$ ; Nurbuda Coal, 3 to  $2\frac{1}{2}$  dis.; Vancouver Coal,  $2\frac{1}{2}$  to 3 prem. Those of British description have also been largely dealt in. Chivertons have been in demand, and close at the highest point of the week  $4\frac{1}{2}$  to  $4\frac{1}{2}$ . West Chiverton, 62 to 63; at the meeting of this mine, on the 29th inst., a dividend of 2l. per share will be declared, as usual. Prince of Wales shares have fluctuated, but close firm, at 39s. to 40s.; Drake Walls, 14s. to 16s.; Chiverton Moor, 6 $\frac{1}{2}$  to 6 $\frac{1}{2}$ ; South Condundur, 18s. to 20s.; Mineral Bottom,  $2\frac{1}{2}$  to  $3\frac{1}{2}$ . At Glan Alun the cross-cut towards the Thortree lode is in most favourable ground for lead, and a great discovery is looked for in a week or two from now; and on the main lode, from one of the discoveries, 50 tons of lead monthly can be easily raised, which will soon be available. Shares are in demand on the Stock Exchange, at 12s. 6d. to 13s. 6d. There are 10,000 shares in this company, 12s. paid, limited to 20s. At Great



Copper ores for sale at the Royal Hotel, Truro, on Thursday next.—Mines and parcels.—Devon Great Consols 1683—Marke Valley 491—Oreika 216—Bedford 100—Wheal Trecroft 100—Marble Hill 100—Fortenice 125—Prince of Wales 23—Wheal Friendship 118—Gunnislake (Clitters) 75—Kelly Bray 66—Cawsand Vale 65—Wheal Crebor 63—East Russell 41—Belstone 37—Caradon Consols 31—Old Gunnislake 25—Devon and Cornwall 25—Colcombe 12—Total, 3657 tons.

Copper ores for sale at Tabb's Hotel, Redruth, on Thursday week.—Mines and parcels.—Clifford Amalgamated 602—South Caradon 544—Glasgow 300—Glasgow Mines 244—Carnegie Mines 357—Hale Road 184—North Trekerby 157—Cradock Moor 101—West Caradon 92—Tresavean 70—West's Ore 64—Tredry's Regula 44—Old Pembroke 3.—Total, 2587 tons.



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### Notices to Correspondents.

**BESSEMER IRON.**—The argument of Messrs. Hinde, in their paper on "New System of Iron and Steel Making," No. VI., published in last week's Journal, that the use of nitrate of soda to supply gaseous matter to the molten pig is merely a costly equivalent of the Bessemer process of forcing atmospheric air through the metal, is not sound. The nitrate of soda would give up its nitrogen in a manner very different to the atmospheric air, and might result in a combination of the nitrogen with the carbon of the iron, and the consequent formation of cyanogen, which has been declared by Binks, Sanderson, and other steel makers to be an important compound in connection with the manufacture of steel. The sodium, too, would also exercise an influence upon the iron, though whether for good or for evil I will leave Messrs. Hinde to determine.—CYANOGEN.

**SAFETY-LAMPS.**—It is frequently stated in the Journal that it is highly desirable that no safety-lamp should be given to a collier which can be opened without extinguishing the light, yet easily-opened locks, and often lamps without any locks whatever, continue to be used. I suppose this arises in most instances from locked lamps costing more, and entailing more work on the lampman. If this be so, will you permit me to ask whether the lamp described some years ago as the invention of Mr. C. H. Waring, of Neath Abbey, is open to those objections? It seemed to me at the time that the simplicity and efficiency of Mr. Waring's lamp could scarcely be surpassed. The fact of its having no lock would positively lessen the lampman's trouble, and as the spring by which the lamp is kept closed cannot possibly be reached until the extinguisher is tightly over the wickholder (by which, of course, the light must be extinguished), it appears to me that absolute safety must attend its use. Can any of your readers inform me whether any maker is at present attempting to introduce this description, and his price for Davy's, Geordies, and glass-sided lamps with this class of fastening?—SAFETY.

**UTILISATION OF SMALL COAL.**—It was stated some time since in the Journal that Mr. D. Barker's invention for utilising small coal by converting it into compressed fuel was to be extensively applied in the Forest of Dean. Can any of your readers inform me whether the works in that district are yet completed, and also whether Mr. Barker's invention is applicable to the non-bituminous as well as to the bituminous qualities of coal? I presume he is still using the farinaceous compound and carbolic acid.—F. H.: Dieppe.

**DYNAMITE-BORING MACHINES.**—If your correspondent who enquires where Dynamite is to be had, and about the Mont Cenis Boring Machine, will favour us with his address, we shall be happy to give him every information.—Messrs. WEBB and Co.: Carnarvon.

**CALDECK FELS LEAD AND COPPER MINING COMPANY.**—With reference to the letter signed "A Shareholder," which appeared in last week's Journal under "Notices to Correspondents," I take the earliest opportunity to give an unqualified denial to the assertions there set forth, and beg to say there are no grounds whatever for any part of the statement.—J. LAINTON, Secretary.

**EARTHQUAKES.**—The letter from "J. B." (Ramsgate) shall appear next week. Received.—"A Chontales Shareholder"—"A Practical Miner"—"Maga"—"D. M."—"Curator"—"F. C. H."—Walter Smart.

## THE MINING JOURNAL,

Railway and Commercial Gazette.

LONDON, NOVEMBER 14, 1868.

### ECONOMY OF FUEL IN THE MAKING OF IRON.

The question of all others the most important to Great Britain is, not whether Mr. GLADSTONE shall be Premier, or whether Mr. DISRAELI shall occupy the first place, but by what means we can most effectually husband our fuel resources. Mr. MILL never spoke more practical philosophy than when he said that provision should be made for the paying off of our National Debt within the period during which our supplies of coal would remain unexhausted. In the *Mining Journal* of Oct. 24 we drew attention to the probable exhaustion of our coal fields, as sketched by Prof. JEVONS, in the papers read by him a few days before at Newcastle; and whilst we said that, taking the world as a whole, we might consider the stores of coal practically inexhaustible, still that could hardly be said of our own stores in particular. No men know this better than those who are engaged in the practical work of winning coal. Happily, whilst we are increasing the quantity we bring up in a rapid ratio—a ratio so rapid that, as we showed in the article already mentioned, the quantity of coal worked yearly from British mines has been nearly trebled during the past 20 years, and has probably increased tenfold since the commencement of the present century—we are increasing in our ability to use a class of fuel which was at one time thought incapable of use for many purposes to which it is now successfully applied. It may, therefore, be concluded that we possess a larger store of mineral combustibles than many persons who estimated our resources from their supposed value, only a few years back, are disposed to admit. Nevertheless, there is the most urgent need for economy, even with all our modern knowledge of the means of making that a source of profit which at one time was thought worthless.

It is well known that in no department of manufacture is there a larger consumption of fuel than in the production of our iron. If, therefore, we can save in that process, we shall be doing much to economise our resources. From time to time we have drawn attention to the means of reducing the fuel cost of iron manufacture, which have been adopted alike by the makers of pig-iron and by the proprietors of mills and forges. The Wilson puddling-furnace, it has been seen, effects a saving of from 20 to 25 per cent. in that process; and if the efforts referred to in these columns a fortnight ago, as about to be made in South Staffordshire, with a view of utilising slack coal in the working of the puddling and mill furnace, should be successful, then another source of economy in the mills and forges,

will exist. As to our pig-iron manufacture, the French ironmasters were the first to teach us how to use our waste gases. Mr. MORRISON, a few years afterwards, adopted the method at the Ferry Hill Furnaces, in Durham. But neither Mr. MORRISON, nor the men who in the Middlesborough district have done so much to secure for Great Britain the position which she now occupies as an iron-smelting country, in comparison with her continental rivals, have stopped there. Perfecting a British invention, they have heated their blast to a point which foreigners had not deemed possible, and they have caused their furnaces to attain an altitude which, by comparison, has dwarfed to almost insignificant proportions the majority of furnaces used throughout most of the iron-making districts of continental Europe. By these means together, the British ironmasters have succeeded, in something like 15 or 16 years, in reducing the consumption of coke per ton of iron to about one-half what it was before that time. But they have not ceased their saving efforts, nor do these figures show the saving that they will ultimately effect.

The most recent exposition of what is being done to economise fuel in the manufacture of pig-iron was made on the 5th inst., in Birmingham, as narrated in another article. Unfortunately, the rules of the association under whose auspices the information was brought out prevent a more detailed account than is there given. We hope that Mr. COCHRANE's paper will be published in a separate form for the perusal of the trade, and that he will not fail to give us the result of further experiments. To the necessarily brief outline of the paper, and the discussion upon it which we give, we will state here that by the use of his new apparatus Mr. COCHRANE effects a saving of from 150% to 160% a year, at an original outlay of 2000. The height of his larger furnace, with its capacity of about 20,000 cubic feet, is 75 ft., which is 40 ft. higher than that of the smaller furnace, with the internal capacity of 7000 cubic feet. By this extra height he has been enabled to do with 26½ cwt. of coke what before took 30 cwt.; and he estimates that with a furnace 113 ft. high 1 ton of iron may be produced in the Cleveland district at a cost of 7½ cwt. of coke. If this amount of fuel should be somewhat under the quantity which actual experiments will show is necessary, still we have no doubt whatever that, with an increased height, and greater cubical capacity, a much larger economy will be effected than has yet been found practicable in the Cleveland district. Of this the Cleveland masters seem themselves to be convinced, for in that district furnaces are at this moment in course of erection which are intended to be 120 ft. high. In the Cleveland district the ore produces some 40 per cent. of iron. If from such material 1 ton of iron can be got at the cost of even 10 cwt. of coke, the ironmasters there, when they have shown this to be possible, will have done great service, not only to the iron trade of this country, but to the whole nation.

What is being done in the North of England is equally encouraging. We said that Mr. MORRISON was the first ironmaster in this country who adopted the French invention of economising the waste gases, and that the British ironmaster had immensely increased the original value of his own system of heating the blast. We believe that even at the present time Mr. MORRISON is working furnaces 105 ft. high, about 26 ft. across the boshes, and is producing 1 ton of iron at a cost of 16 cwt. of coke. But whilst the Cleveland stone contains only 40 per cent. of iron, that of Durham is very much richer, and Mr. MORRISON has got his cast-iron calcining stoves up to so great a degree of perfection that he is working his furnaces at the great uniform heat of—if we are not mistaken—1100°.

We have felt the utmost satisfaction in this drawing attention to what the ironmasters in this country are doing to husband our resources; they are taking a foremost part in the solving of the great commercial problem which comes up in every consideration as to the future of this kingdom.

### NORTH OF ENGLAND INSTITUTE OF MINING ENGINEERS.

The value of practical experience, combined with scientific knowledge, was, probably, never more completely and satisfactorily demonstrated than by the address of Mr. GEORGE ELLIOT, the newly-elected President of the North of England Institute of Mining Engineers, which is fully referred to in another column. From the humble position of a pit boy Mr. ELLIOT has succeeded by continued energy and perseverance in attaining a position in the engineering profession second only to that of President of the Institution of Civil Engineers; whilst as an evidence of the high esteem which he enjoys apart from his profession, it will suffice to mention that he is the Conservative candidate for North Durham, and has every prospect of success. The address here alluded to contains a mass of information and suggestions which would do credit to the most competent of the Presidents of the British Association for the Advancement of Science, and the results to be anticipated from it will certainly not be less, seeing that the facts and propositions are put forward by an undoubted authority, and offered for the consideration of those who can well appreciate them. All the principal questions which it is desirable should form subjects of discussion amongst mining engineers are also in turn referred to, and in a manner that suggests a mode in which they might be conveniently handled. Mr. ELLIOT's views are decided, and sometimes startling, but as he declares that he is prepared to stake his professional reputation upon their accuracy, it is but fair to believe that the statements have not been made without due deliberation, and careful study of the points involved.

Mechanical ventilation, as compared with ventilation by the furnace, has decidedly Mr. ELLIOT's recommendation, whilst the alarm which has been raised as to the approaching exhaustion of our coal supply he evidently regards as unjustifiable. No approximate estimate can, in his opinion, be formed as to the extent of coal yet unworked. That lying under the Permian and New Red Sandstone has been comparatively untouched; and according to his estimate, "but a very small percentage of our coal has been brought to the surface during the hundreds of years we have been at work. In some districts, notably in South Wales, scarcely more than 1 per cent. has been moved. If, therefore, we add the coal under the bed of the ocean to that already at our disposal by known means we find a supply which is more than sufficient to allay the alarming fears which have been expressed." As to the under-sea coal, Mr. ELLIOT does not anticipate any difficulty in working it; but, on the contrary, observes that the fields to be worked below the sea, on our east and west coasts, especially in the counties of Durham, Northumberland, and Cumberland, are in themselves enormous, and will be, for all practical purposes, as entirely within the reach of the mining engineer as the ordinary workings out of which coal is hewn. Geology indicates that in many districts the coal strata extend seaward 10 or 12 miles beyond the shore; and it is his firm belief that, by sinking ventilating shafts in the German Ocean, the coal below it might be worked as safely and certainly as it is beneath where he was then standing.

The comparative merits of the various modes of working coal was another subject referred to as worthy of being fully discussed by the members of the institution, Mr. ELLIOT reminding them that they must have the courage and energy to adopt improvements, lest their fame should be tarnished and their laurels dimmed, merely because they had stood still while the world around them had advanced. The subject of devising a means for superseding the use of gunpowder in mines is one which opens a large field for inventors, more especially as there can be no question that any really practicable invention would be readily adopted. Mr. ELLIOT's remarks as to the best mode of working coal, and his observations upon the increase of temperature in mines, are particularly interesting; whilst his suggestions for uniting the whole of the mining engineers in the country into one community cannot fail to be productive of good results. The feeling generally entertained, both towards Mr. ELLIOT and with regard to his address, was admirably stated by Mr. J. MORRISON, when he observed that he had listened in his lifetime to many addresses, but he had never listened to one more fruitful, from beginning to end, with that which was instructive, with that which was suggestive, and with that which was calculated to lead our minds into the right channel of thought and feeling; and there was not a single gentleman who attended that meeting that day who did not rise from his place, after hearing that address, feeling that he was proud, very proud, of "the pit-boy," as the President was pleased to call himself, who had risen from the pit-boy to be a man in the full stature of his nature, and who might stand and say to the world that he was a man. He ex-

pressed the feeling of every one of them when he said that their worthy President delivered himself in a manner worthy of the great institution over which he presided, and worthy of a genius that had produced some of the most celebrated men of the age; and he said, without any flattery whatever, that amongst those celebrities was the worthy and esteemed President of that institution. He hoped they would pardon him, but he was himself, like Mr. ELLIOT, a self-made and self-educated man, and his heart felt a kindred feeling, therefore, and warmed towards Mr. ELLIOT; and he hoped Mr. ELLIOT's example would actuate, and teach, and guide others. As the exponent of the feelings of Newcastle, he repeated that Newcastle would be proud of the speech which Mr. ELLIOT had delivered that day, and proud of the son of the North who had delivered it.

### INSTITUTION OF CIVIL ENGINEERS.

The Council of this Institution have just issued their list of subjects for which premiums are offered for 1868-69. The principles upon which the awards are made are extremely liberal. The Council do not bind themselves to award any premium should the communication not be of adequate merit, but they will award more than one premium should there be several communications upon the same subject deserving of that distinction. But this is not all. Although from the high position of the institution the greatest honour attaches to those who are successful in obtaining its premiums, the absolute merit of the communications is alone considered, it being a distinct condition that in making the award "no distinction will be made whether the communication has been received from a member or an associate of the institution, or from any other person, whether a native or a foreigner." Many of the subjects upon which the Council invite communications are of peculiar interest to the readers of the *Mining Journal*, and it is much to be hoped that the premiums offered will cause increased attention to be directed to them. At the present time, when much importance is attached to the establishment of closer railway connection between London and the Continent, and whilst rival projectors are disputing with regard to the relative advantages of bridges and tunnels between the English and French coasts, a communication "On Railway Ferries, or the Transmutation of Railway Trains entire across Rivers, Estuaries, &c., might not only furnish a practical solution of the question, but might offer enormous facilities to an inventor (by securing him the recognition of so influential a body as the Institution of Civil Engineers) seeking the assistance of capitalists to enable him to give his discovery a practical form. Another subject, which appears to be especially calculated to call forth the energies of mining engineers, is—"Description of a Modern English Locomotive Engine, designed with a view to cheapness of construction, durability, and facility of repair." Such an engine is precisely that which is required for our vast mineral traffic, and is one, moreover, which would, doubtless, take such a form as would admit of its being constructed of reduced size, so as to adapt it not only for the surface works at collieries, but with trifling modifications, to underground haulage also. "On the Construction of Catch-water Reservoirs in Mountain Districts, for the Supply of Towns, for Irrigation, or for Manufacturing Purposes," is likewise worthy of their consideration. The districts in which mining operations are carried on are frequently mountainous, or at least sufficiently so to permit of a large amount of motive power being obtained from this source; and there can scarcely be a question that an engineer who could so far satisfy the Institution of Civil Engineers of the merits of his plans as to secure the award of a premium, would thenceforward find ample professional practice from that source alone to keep him fully employed. A paper "On the Safe Working Strength of Iron and Steel, including the Results of Experiments on the Elastic Limit of Long Bars of Iron, and on the Rate of Decay by Rusting, &c., and under Prolonged Strains," would doubtless be of considerable value to the mining branch of the profession, whilst it is a subject upon which the members of that branch could certainly furnish a vast amount of valuable information.

But it is not alone for communications upon such subjects as these, which some may regard as only indirectly connected with the mining interest, that the Institution of Civil Engineers offer their premiums; there are some which are so immediately connected with both mining and metallurgy that mining engineers and metallurgists would possess undoubted advantages in competing for them. On Coal Mining in Deep Workings, including Machinery for dispensing with Gunpowder in getting Coal; On the Present Systems of Smelting Iron Ores; On the Conversion of Cast-Iron into the Malleable State, and of the Manufacture of Iron generally, comprising the distribution and arrangement of Iron Works; On Machinery for Rolling heavy Rails, Shafts, and Bars of large sectional area, and for Forging heavy masses of metal; On Steel, and its present position as regards production and application; and On Machinery for Washing Lead Ores, are each of this class, and should, therefore, receive the immediate attention of the classes mentioned, as both pleasure and advantage would assuredly be the result.

The following is the list of awards made by the Council for papers contributed during last session:—

- A Telford Medal, and a Telford Premium, in books, to GEORGE HIGGIN, M. Inst. C.E., for his paper "Irrigation in Spain, chiefly in reference to the Construction of the Henares and the Esla Canals in that country."
- A Telford Medal, and a Telford Premium, in books, to CHRISTIAN PETER SANDBERG, Assoc. Inst. C.E., for his paper "On the Manufacture and Wear of Rails."
- A Telford Medal, and a Telford Premium, in books, to Lieut.-Col. PETER PIERCE LYONS O'CONNELL, R.E., Assoc. Inst. C.E., for his paper "On the Relation of the Fresh Water Floods of Rivers to the Areas and Physical Features of their Basins."
- A Telford Medal, and a Telford Premium, in books, to WILLIAM WILSON, M. Inst. C.E., for his "Description of the Victoria Bridge, on the line of the Victoria Station and Pimlico Railway."
- A Telford Medal, and a Telford Premium, in books, to CHARLES DOUGLAS FOX, M. Inst. C.E., for his paper "On New Railways at Battersea; with the Widening of the Victoria Bridge and Approaches to the Victoria Station."
- A Telford Medal, and a Telford Premium, in books, to JOHN WOLFE BARRY, M. Inst. C.E., for his paper "On the City Terminus Extension of the Charing-cross Railway."
- A WAIT Medal to EDWIN CLARK, M. Inst. C.E., for his paper "On Engineering Philosophy: the Durability of Materials."
- A Telford Medal to WILLIAM JARVIS MCALPINE, M. Inst. C.E., for his paper "On the Supporting Power of Piles; and on the Pneumatic Process for sinking Iron Columns, as practised in America."
- A Telford Premium, in books, to THOMAS LOGAN, M. Inst. C.E., for his paper "On the Benefits of Irrigation in India; and on the Proper Construction of Irrigating Canals."
- A Telford Premium, in books, to ALLAN WILSON, M. Inst. C.E., for his paper "On Irrigation in India."
- A Telford Premium, in books, to WILFRID AIRY, Assoc. Inst. C.E., for his paper "On the Experimental Determination of the Strains on the Suspension Ties of a Bowstring Girder."
- The MANBY Premium, in books, to ANDREW CASSELS HOWDEN, Assoc. Inst. C.E., for his paper "On Floods in the Nerbudda Valley; with Remarks on Monsoon Floods in India generally."

\* Has previously received a Telford Medal.

### MODERN BLAST-FURNACES.

A subject of great interest to the iron trade of this country was ably discussed at the meeting of the Mechanical Engineers in Birmingham, which was attended by an unusually large number of ironmasters. The author of the paper was Mr. CHARLES COCHRANE, and its subject "The Further Utilisation of the Waste Gases from Blast-Furnaces, and the Saving of Fuel by Increased Capacity of Furnace," of which we give an official summary in another column. An animated discussion ensued, in which Messrs. SIEMENS, GEO. ADDENBROOKE, SAMUEL LLOYD, SAMUEL LLOYD, MARTEN, and COOPER took part. Mr. SIEMENS considered that Mr. COCHRANE had rather over-estimated the regenerating power of the descending materials in the upper portion of the large furnace, and that in the more extended operations to which Mr. COCHRANE had alluded it would be found that the saving from this source would not be at so high a ratio as he had calculated. Mr. ADDENBROOKE stated that a furnace was now working in Yorkshire on the open-topped plan, which he advocated, and he understood that it was doing very well. The open-topped plan, of course, would render such machinery as Mr. COCHRANE had described of no value. With regard to the yield also of the larger furnace, he was surprised that the consumption of fuel was not smaller, as in furnaces in the South Staffordshire district, with the yields of which he was well acquainted, he could say a result was being obtained by which 1 ton of iron was being produced with nearly as few hundred-



weights of raw coal as in the North they were taking the finest Durham coke to effect, and when the actual weight of carbon which was charged into the furnace per ton of iron was taken into account, the yield was very much to the advantage of South Staffordshire. It was true that the ironstones of South Staffordshire were somewhat richer than those of the North, and, perhaps, more easily fused, but he did not consider that there was a sufficient difference in these particulars to account for the superior carbonaceous yield of South Staffordshire. He stated also that quality in the South, and not quantity, was the great consideration, and asked a question, which did not appear to have been heard by Mr. COCHRANE, as to what improvement in quality took place from the large furnace. He was a great advocate of extending both the capacity and weight of furnaces.

Mr. MARTEN elicited from Mr. COCHRANE the expression of an opinion that, owing to the friable nature of the South Staffordshire coal, furnaces in that district could not be advantageously erected more than 50 feet high, not because the crushing weight of the incumbent mass would be too great for the coal, but he feared the fuel would not stand the grinding motion. Mr. MARTEN said that although it was a formidable matter to differ from Mr. SIEMENS, yet he must say that he did not agree with the arguments of that gentleman on the present occasion. Mr. SIEMENS appeared to him to have gone on a ratio of regenerative influence for the upper portion of the furnace limited to identical filling, whereas the filling was not identical in the large furnace, the fuel being much less in proportion to the whole materials charged than in the smaller furnace, and hence with every increment of furnace the regenerative influence would be in proportion to the larger quantity of absorbing materials charged, whilst the calorific to be absorbed would be diminished by the less proportion of fuel charged; and hence that, in his opinion, the action and reaction introduced by these circumstances would produce results rather more favourable than Mr. COCHRANE'S calculations. Mr. MARTEN concluded by observing that although he was very loth to make use of an expression which might be misunderstood, yet he considered that the future construction of large furnaces would go in the direction of increase of "bosh."

After a few words from Mr. BRAMWELL, who presided, a very cordial vote of thanks was passed to Mr. COCHRANE, who was asked by the Chairman to favour the association by communicating the result of the erection of larger furnaces in the Cleveland district.

It should be noted that the reason why furnaces of large capacity are more economical than those of smaller dimensions was made known, we believe, for the first time in this paper. They are not stated in the official synopsis of the paper, but Mr. COCHRANE explained that his experiments had shown that they were to be traced chiefly to the regenerative influence of the larger quantity of materials in the upper portion of the large furnace. We had all known that the large were more economical than the smaller, but why they were so not even the men whose experiments had led to the preference were, we imagine, aware.

**HEATON'S PATENT PROCESS FOR THE CONVERSION INTO STEEL OR IRON OF INFERIOR ORE.**—In the article which appeared in the Journal of last Saturday, on this process, the following concluding paragraph of the report of Prof. MILLER was by accident omitted:—"In conclusion, I have no hesitation in stating that HEATON'S process is based upon correct chemical principles: the mode of attaining the result is both simple and rapid. The nitric acid of the nitrate in this operation imparts oxygen to the impurities always present in cast-iron, converting them into compounds which combine with the sodium; and these are removed with the sodium in the slag. This action of the sodium is one of the peculiar features of the process, and gives it an advantage over the oxidising methods in common use."

**CANADIAN TITANIFEROUS IRON.**—It will be remembered that at the recent Paris Exhibition honourable mention was awarded for specimens of the Moisie (Nova Scotia) iron, yet it is probably not generally known that so high is the quality of this brand that in strength it positively surpasses by nearly 5 per cent. the justly celebrated Low Moor iron. Its capacity for elongation is  $7\frac{1}{2}$  in. in 10 ft., so that it would seem to be admirably adapted for drawing into wire. The analysis of Mr. Poinat, a well-known French chemist, shows the ore from which it is manufactured to contain—magnetic oxide of iron, 51.12; peroxide of iron, 34.60; titanate acid, 11.27; and silica, 3.01 per cent. The Moisie iron is a good description for boilers and iron shipbuilding, and, judging from the experiments which have been made with it, it is altogether a very superior quality of metal. With regard to the facility for obtaining a permanent supply of the iron, Dr. Sterry Hunt writes that the bed of magnetic ore at the Moisie is of immense extent, readily accessible, and, as far as can be judged, of very excellent quality.

**STREET TRAMWAYS.**—The local authorities of Chicago, U.S., have agreed to permit Mr. Z. EASTMAN, whose system of street tramways was described in the *Mining Journal* of Feb. 1, to lay his tramway in one of the principal thoroughfares in that city. The advantages claimed for the system are that it does not interfere with the ordinary traffic, and rather improves than damages the road.

**THE COAL TRADE OF NOVA SCOTIA.**—It is gratifying to find that the immense extent of the mineral resources of this province become more and more apparent as their development is proceeded with. The opening of the Drummond Colliery, belonging to the Intercolonial Company, affords an instance of this, the colliery works having fully confirmed the opinion of scientific men, that the seam is an extension of that so profitably worked at the celebrated Albion Mines, the Drummond Colliery seam possessing the additional advantage that, although somewhat diminished in thickness, it is of greatly improved quality. But it must not be supposed that the diminution has reduced the seam to an unimportant size; the Drummond seam has still a vertical thickness of 16 feet of good coal, and concerning it Dr. Dawson expresses the very satisfactory opinion that if, as appears probable, it is continuous nearly across the area, it presents one of the finest mining properties in that or any other country. The colliery is furnished with an excellent plant, and the surface machinery and general arrangements are all that could be desired.

**CALORIC ENGINES.**—Since the opinion that the heat of the sun may be utilised in the production of motive power has been gaining ground, several inventors have turned their attention to the construction of improved hot-air engines, it being generally considered that from this description of engine that the most successful results from this source are to be anticipated. Mr. H. D. WALLER, jun., of Fort Columbus, New York City, is one of the latest inventors in this direction, and he claims that he has succeeded in providing a hot-air engine which will work with better results than those heretofore made. The general features of the invention consist in the employment of two parallel cylinders, each cylinder being provided with air-heating chambers at each end. The cylinders communicate with each other through suitable ports opening from the heating chamber of one cylinder into the adjacent heating chamber of the other, and these ports are provided with valves, the timely operation of which is accomplished by suitable valve gear. The pistons are made by means of any suitable "lost motion" device to move and rest alternately; one piston being at rest either at the top or bottom of the stroke, while the other piston is making the stroke towards the resting piston. This action allows time for the air to be received into and heated in the air chambers at either end of the cylinders, which is a prominent feature of the invention. Another advantageous feature is obtained in the utilisation of the excess of pressure in the first cylinder to assist in actuating the piston of the second or auxiliary cylinder, whereby the expanded air of the first cylinder escapes into the second heating chamber, and by its pressure assists to actuate the second piston to make its stroke whilst the first piston is resting.

**EXTRACTION OF COPPER FROM THE ORE.**—The extraction of copper by the wet way is being successfully carried on in Nevada by Mr. JOHN RAMDOHR, who has introduced some important modifications in the process. The ore having been first dry crushed to a fine powder is placed in a large tank, and subjected to the action of dilute sulphuric acid, heat being applied to the bottom of the tank (which stands upon a furnace) to hasten the process of dissolving the copper contained in the ore. When dissolved the solution is drawn off into a large filtering tank, and from this is conducted into a precipitating tank. In case it is intended to manufacture blue-stone from the solution, it is conducted to the evaporating pans, and thence, after being sufficiently reduced, is placed in pans lined with lead for crystallisation, and it is then ready for sale. For the production of metallic copper the process is precisely the same as for the making of blue-stone, up to the point of running the solution from the filter. To obtain metallic copper the solution is conducted from the filter to a large precipitating tank, where it is precipitated by the use of metallic iron in a state of fine division, and at once becomes metallic copper in fine grains. The metallic iron used in precipitating the copper contained in the solution is obtained from the ore itself. The crushed ore, which contains a considerable percentage of iron, is taken just as it comes from the batteries, and having been mixed with a quantity of pulverised charcoal is placed in iron tubes or cylinders, and kept for a length of time at a certain heat, by which time the

iron is annealed and becomes metallic, and then is ready to be used in the precipitation of the copper obtained in solution by the first process. This iron powder acts almost instantaneously, and all the copper in a tank of the solution, no matter how large the tank, may be precipitated in less than an hour. After the copper has been precipitated there remains in the solution sulphate of iron (green vitriol), and this is evaporated and crystallised in the usual way, when it is used for the manufacture of sulphuric acid, to be again employed in the process of dissolving the ore in the first operation. After the distillation of the sulphate of iron for the production of sulphuric acid, there remains behind in the retorts used a substance called colcothar—a red oxide of iron, sometimes used as a pigment and for polishing glass. Thus it will be seen that the ore is made to furnish the materials by which it is worked; the only loss is about 10 per cent. of sulphuric acid. From the facility with which iron ore could be mixed with that of copper when an insufficient quantity of iron is contained in the ore, would appear to indicate that the process is well worthy of a trial in Great Britain.

#### MINING, METALS, AND MINERALS—PATENT MATTERS.

BY MICHAEL HENRY,

Patent Agent and Adviser, Memb. Soc. Arts, Assoc. Soc. Eng.

Mr. HENRY BESSEMER, of Queen-street-place, Cannon-street, the celebrated engineer, has specified a patent, relating to the manufacture of refined iron and of malleable iron and steel, the art in which he has already introduced so many improvements. This invention consists in forcing or injecting into molten crude iron or remelted pig-iron, or other carburet of iron in a more or less refined state, streams or jets of fused or fluid nitrate of soda or nitrate of potash, or other fused or fluid substances, which contain, or are capable of evolving, oxygen when brought in contact with fluid iron, such substances being used alone or in conjunction with oxides, peroxides, or silicates of the peroxides of iron or manganese. The streams or jets of fused or fluid matters are projected downwards, at any desired angle from nozzles or tuyeres, the orifices of which are situated above the mean level or upper surface of the fluid iron to be operated upon, a portion of the said fused or fluid matters, as well as a portion of the cinder or oxides produced in the process, being again carried down into the molten metal as an induced current, caused by the passage of the said jets or streams, which will pass downward through any fluid matters floating on the surface, and penetrate the fluid metal, and be there more or less decomposed, and operate upon the metal and the impurities contained therein, and will more or less decarbonise and refine the iron, and convert it into steel or into malleable iron, or into a more or less refined cast-iron, dependent on the quantity and constituents of the fused or fluid matters ejected therein.

Mr. HUGH KENNEDY, of New Orleans, has obtained Letters Patent for an invention for a machine for cutting files. It appears from the specification that this invention relates to a machine wherein the file-blank is supported below a vibrating cutter, which, by a succession of blows, forms the teeth from end to end of the said blank, either the cutter or the blank being caused to travel in the proper direction, to cause the teeth to be cut regularly from end to end of the same. The nature of the invention consists chiefly in regulating, controlling, and varying the movements of either the cutter or the file-blank, so that the teeth cut in the latter are not exactly parallel with each other; also in the peculiar construction and arrangement of the mechanism for supporting and adjusting the file-blanks; in the novel formation of the cutter, and in the mode of and means for operating and adjusting the same.

Messrs. J. C. COOMBE and JOHN POOLE have obtained provisional protection for a joint invention, relating to coating iron, steel, and such like surfaces, and protecting and preserving them from the corrosive action of sea or salt water, and the oxidising influences of damp air, wet, and moisture. This invention consists in coating the said surfaces, while hot or heated, with a solution of copal, or any resinous gum insoluble in water, and spirits of wine; the said solution thus applied is intended to be used as a "priming" before painting. Applied alone it will protect and preserve the said surfaces from the corrosive action of sea or salt water, and from the oxidising influences of damp air, wet, and moisture. Applied between the said surfaces and the paint it will act as a non-conductor, and prevent any galvanic action between the latter and the former, or between the paint and the metal.

A specification has just been filed for a patent taken in my name, as a communication from the Société Coignet, who are the patentees of the celebrated beton, or concrete, for submarine and other constructive and architectural purposes. The present patent relates to a mode of treating ores and other metallic compounds, matters, or products, by pulverising the ore or other matter very finely together with the carbon required in the operation, or a portion of it, and the fluxes or other substances needful in the reduction or other process. M. Coignet mixes all these ingredients well together, and works them up with a minimum quantity of water, so as to obtain the mixture in a state of powdery paste, or paste-like powder, and this he rams, presses, and works well up together, till an agglomerated mass is obtained, which is formed into blocks. These blocks are piled up in a furnace with layers of fuel, or all the fuel required may be worked up in the blocks. An improved furnace is described, in which the hot products of combustion are forced to pass downward through the concrete blocks in the furnace, and pass away from the bottom portion into a chimney, the molten metal being run off, together with the slag, into a suitable hearth or chamber. A refrigerator is provided at the bottom of the furnace, through which the hot gases pass, and where they part with their excess of heat.

#### REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Nov. 12.—The position of the Iron Trade of this district is decidedly satisfactory. Orders for shipments to the North of Europe are now over for the season, and in the United States the great struggle for the Presidency has done much to withdraw attention from business; but in spite of these drawbacks, and the adverse influence on home operations of a general election of unusual ardour, the orders continue to be moderately good, and the iron works are, as a rule, well employed. The accounts from the United States are favourable to an increased demand from that great country now that the turmoil of the election is over; and as the result has been the choice of a straightforward man, who works and does not talk, and who is regarded on all hands as firm without violence, we may reasonably look for a steady recovery in its commercial prosperity. It is very probable that railway requirements will be considerable next year, and should confidence be created in European peace we may anticipate that the large hoards of gold which lie stagnant in the vaults of the banks in Paris and London will flow in numberless channels of profitable enterprise. The demand for heavy ironwork, chains, cables, anchors, corrugated sheets, &c., is good; and there is a disposition not to accept orders in advance at present rates, lest the price of iron should be raised shortly after spring. There is a very good demand for coal, and the Hardware Trades generally are in a satisfactory state, though the improvement is, perhaps, less decided than in the iron trade. On the whole, we look forward to the winter without misgiving, and to next year with confident hope of a decided improvement.

The Birmingham Town and District Banking Company lately offered for sale the blast-furnaces and iron works at Tipton, formerly carried on by Messrs. E. Creswell and Sons, but no purchaser was found at the reserved price. The same result attended an effort to sell the furnaces which were carried on by Messrs. John Hopkins and Son at Dudley Port. Mr. H. O. Firmstone has taken the works carried on by Messrs. Lee and Bolton, at the Hyde, near Stourbridge, and from his position as an ironmaster there is every prospect of a successful result. A report of the trustees appointed under the bankruptcy of Messrs. W. Haden and Son, of Dixon's Green, Dudley, gives but little prospect of a good dividend. They have failed to get even a bidder for the landed and mineral properties, and the latter had cost a large amount to keep in saleable order. They also report the transfer of money and securities to relatives immediately before the failure, which they are seeking by legal means to have restored.

This is Martinmas week, when, under the old system, yearly engagements in the Potteries were made. That plan is less resorted to now than it was, but the week continues to be an important anniversary. The trade has during the year been depressed, and though prospects are better there is as yet no very decided improvement.

The decision obtained by Mr. Brough, that it is incumbent on proprietors of mines adequately to ventilate old workings which are so contiguous to existing workings as to be a source of danger, is of the

greatest importance. This puts into the shade the decision in the case of the Queen against Cope, as there it was simply to enforce the duty of fencing off old workings likely to contain dangerous gases. To carry out the requirement will, no doubt, involve difficulties; but once done, a great source of danger will be removed. Surely with the means at the disposal of mechanical engineers, a great current of air can be forced at great pressure through old workings, so as to render impossible any great generation of inflammable gas, which a fall may send in a large volume into the working places. The decision, and the steps taken to secure it, furnish a strong answer to the letters of the two "Iron and Coalmasters" with reference to the report, and the conduct of Mr. Baker in contrast with that of Mr. Brough. It may be mentioned that the Mine Agents' Association of South Staffordshire and East Worcestershire have republished the letter from "A Coal and Iron Master" which appeared in the *Mining Journal* of Oct. 24. There is, however, no reply to the letter which afterwards appeared in answer to it.

Last week a meeting of miners was held at Gornal Wood, near Dudley, to consider "The best means of bringing about the better inspection of mines, and other matters." Mr. Breakwell, the secretary of the Miners' Association, was present, and addressed the meeting, and showed the absolute necessity of organisation. He enumerated the many evils which, as a class, were the property of both physical, moral, and social, and pointed out that it was shown in last year's Government Inspectors' return sheet on mines that 1200 persons had lost their lives in Great Britain by accidents of different kinds, and he was of opinion that two-thirds of that number of lives were recklessly sacrificed through gross neglect. He therefore suggested that the colliers, as a body, should agitate for, and demand, sub-Inspectors, to be appointed out of their body, to assist the Government Inspector, whose duties were too arduous now to fill the office satisfactorily to the men; also that a bill be introduced in the next Parliament, to allow sub-Inspectors of mines, and to make owners of any mine, pit, or factory responsible for the neglect of the manager, butty, doggy, or anyone acting as deputy for him in the mine, pit, forge, or factory. He pointed out that it would be good policy to lay these matters before any gentlemen who might now be in the field claiming their suffrages, in order to get their views upon the subject prior to being returned to serve Parliament. He concluded with an earnest appeal to the trade to get thoroughly organised for the interest of all parties. The Chairman and several other miners addressed the meeting, after which the following resolutions were carried:—"That we, the miners of Gornal Wood, and believing in the great benefit of union, hereby express our desire to re-establish a thorough state of organisation among our body; also, we pledge ourselves to use our influence and exertions to obtain sub-Inspectors, in addition to the Government Inspector, Mr. Baker, so that our lives may be made more secure from any gross neglect, and not placed in such jeopardy. Furthermore, we agree to form ourselves into deputations to wait upon our respective employers, to seek an advance on our present low rate of wages."

Peter Murray, a miner, 22 years of age, was killed on Saturday by his own imprudence at the Hamill Colliery, Burslem, belonging to Messrs. Plant and Co. He was working in an upper shaft, from which the shaft descended 120 yards to a lower one. Whilst the hooker was away for a few minutes the descent very improperly undertook his duties, and fell with the load down the shaft, and was instantaneously killed.

**UTILISATION OF BLAST-FURNACE GASES—ECONOMY OF FUEL.**—Mr. C. COCHRANE, of Dudley, read a paper at the Institution of Mechanical Engineers, Birmingham, on "The further Utilisation of the Waste Gas from Blast-Furnaces, and the Economy of Coke due to increased Capacity of Furnace." With the increased capacity of the present large blast-furnaces in the Cleveland district, the waste gas given off from the furnaces is so far impoverished, both in quantity and quality, that, in order to maintain a uniform supply of gas for heating purposes at the steam boilers and hot-blast stoves, it is of importance to utilise the whole of the gas given off from the furnace, by preventing the loss of gas hitherto occurring at the times of lowering the closing cone or bell for charging the materials at the top of the furnace. Although the time during which the gas can thus escape through the open mouth of the furnace is not long at each lowering of the bell, the entire loss of gas amounts to fully 6 per cent. of the total quantity of gas evolved from the furnace; and the escape of the gas at the furnace mouth occasions an interruption in the supply for heating purposes, and a liability to explosion in the steam boilers and hot-blast stoves. These objections have been obviated by the writer by a plan of doubly closing the furnace top, the ordinary closing bell and hopper being completely closed in by the addition of an outer cover, containing flap-doors, through which the charging materials are filled into the hopper. These doors are closed at the time of lowering the bell for dropping the charge into the furnace, so that the only escape of gas that can take place is a quantity equal to the capacity of the hopper at each time of lowering the bell, which is insignificant in amount. This plan of closing the furnace top has now been in successful operation for nine months at the Ormesby Iron Works, Middlesbrough, and continues to work most satisfactorily. The economy of coke due to increased capacity of furnace is shown by the working of one of the original furnaces at the above works, having an internal capacity of only about 700 cubic feet, as compared with that of the larger furnaces at the same works, having a capacity of about 20,000 cubic feet. The average consumption of coke per ton of iron made in 26½ cwt. in a larger furnace, being 14 per cent. less than in the small furnace; and at the same time the waste gas from the larger furnace evolved at a temperature of only about 500° Fahr., or 110° below that at which it leaves the smaller furnace, on account of the heat of the gas being taken up to a greater extent by the materials in the top of the larger and higher furnace. The causes were explained that account for the economy of fuel in the large furnace; and assuming that, by further enlarging the capacity of the blast-furnace, the further reduction of temperature effected in the gas taken off would be in the same proportion as the reduction already obtained with the present increased size of furnace, it was shown by calculation that the extreme limit of economy, when the escaping gas would be reduced to the temperature of the external atmosphere, would be reached by increasing the capacity of the furnace to about three times that of the present large furnaces in the Cleveland district, provided that no practical difficulties interfered.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

Nov. 12.—Business generally remains in about the same state as noticed last week, several of the large iron establishments being more fully employed than for a considerable time previously. There has been no falling off in the out-put of pig-iron, but which is likely to increase by some more furnaces being put in blast. There is also a better enquiry for castings, including pipes. The coal trade has improved considerably of late, so that the colliers are more fully employed than they have been for some months previously. The carriage of coal by railway into London for October has been about the largest during the year, and foremost amongst the localities which have benefited by the increase is Clay Cross, from which 32,100 tons were sent during the month, out of a total tonnage which entered the metropolis by all lines of railway of 284,942 tons. From Eekington, Staveley, Pinxton, Langley Mill, and from other places, there is more doing, and it may fairly be assumed that business will continue to improve as the winter season advances. Gas coal is in request, a good deal being forwarded into Birmingham and the Midland and western districts. Sinking operations are being carried out in various parts of the county, and it is said that at Tibshelf, where a colliery is being opened out, the coal field taken by Mr. Elliot will prove to be amongst the largest in North Derbyshire. Electioneering proceedings have been pushed forward during the week with great energy, and the "working man" has been in great request, everyone interested in the fate of the various candidates taking to him as a veritable "pet." The contest in the division of which Chesterfield is the head promises to be very keen, whilst Mr. Jackson and his colleague in the northern division are opposed by Mr. Arkwright, of Willemsley, Matlock, whose family are largely interested in the minerals of the county. If returned to Parliament he promises to "carefully watch all measures which may affect the important mineral interests of this division of the county."

As previously noticed, the general trade of Sheffield continues to improve, although to some extent business is impeded by the deep excitement which rages with regard to the result of the election for the borough. Rails and merchant iron generally are in good request, and there are some considerable orders in hand for steel. The same state of affairs may be quoted with regard to the Rotherham district, where the various iron works are now kept well going. At Milton and Elsecar also there is no falling off in the trade, which is still active in almost every branch, the Messrs. Dawes having been able during the greater part of the year to keep their men well employed even when other works were all but standing. There is an improved demand for house coal for the metropolis, both of the best qualities of the Barnsley seam and of Silkstones. From Kilmarnock alone 9965 tons were forwarded by railway, and 18,615 tons, Silkstones, of which Newton and Co. sent 5708 tons, Clarke's 4502 tons, and Wharfedale 3741 tons. In steam coal there is no alteration to be noticed, so far as regards the business doing to Grimsby, which still continues very fair, whilst there is no increase in the tonnage going to Hull, and to which we may now look forward to a considerable decrease. It may be said with regard to Hull that, owing to the quantity of coal sent there from some of the Nottingham pits, the South Yorkshire collieries have scarcely been able to hold their own, so that prices have been much lower than they were last year. So far as regards quality, however, the advantage is with the produce of the Barnsley coal field. The trade to Lancashire is still characterised by quietness and low prices, the Wigan coal in many districts successfully competing with the South Yorkshire, having a much less mileage rate to pay. At the Tinsley Colliery, near Sheffield, belonging to Mr. Huntsman, there has been a dispute, and the men after being out for a few days have resumed work, agreeing neither to give or accept any notice whatever on leaving. During the week six bodies have been recovered from the Oak Colliery, and it is expected that no considerable time will now elapse before a good many more will be reached.

**SOUTH YORKSHIRE MINING VIEWERS' ASSOCIATION.**—A meeting of the members was held on Wednesday, at their rooms, at Barnsley, convened for the purpose of taking into consideration a proposal made to extend their rules, with a view to including in its ranks all the colliers, and all who have the management of underground colliery workings. In the absence of the pre-



ident, Mr. Woodhouse, of Derby (owing to the death of the Marquis of Hastings, and of whose collection he was the head), the chair was taken by Mr. Embleton, when the subject which had called the members together was introduced, Mr. Mammatt, the secretary, being present. A deputation from the new body which recently met in Wakefield, consisting of Mr. P. Cooper, Mr. Miller, Mr. Minto, Mr. Hodgson, and Mr. J. Beaumont, was then introduced, the members of which fully stated their views with regard to the necessity for organising a body which should include viewers and stewards, and those who had the management of collieries, with a view to the interchange of ideas on all matters relating to the working of mines, the reading of papers, discussions, &c. The deputation also stated what had been done at the two meetings held at Wakefield and Barnsley, and the initiatory steps which had been taken in forming the Yorkshire Miners' Association. The deputation were very cordially received by the members of the Viewers' Association present, and the subject was freely discussed. However, in the absence of Mr. Woodhouse no decision was come to, but it was agreed that a copy of the rules drawn up for the conducting of the new association should be forwarded to Mr. Mammatt, the secretary of the Viewers' Association, with a view to their being submitted to a future meeting, which would have the advantage of the presence of Mr. Woodhouse. The new association, it is said, has obtained numerous promises of support from influential colliery proprietors, and it is not unlikely that it will take in the entire coal field, including Derbyshire, Leicestershire, and Nottingham. By thus extending the area of its operations its value will be greatly enhanced, so that there will be a Midland Association instead of one confined entirely to Yorkshire. Seeing, also, that Mr. Woodhouse is extensively engaged in mining operations in the counties named, it is believed that the extension will meet with his approval. However, whether the association be connected with the one at Barnsley or not, it cannot fail to be of the greatest advantage to those persons connected with our collieries who are desirous of being acquainted with all improvements, inventions, and suggestions calculated to ensure the safe working of our collieries.

#### REPORT FROM NORTHUMBERLAND AND DURHAM.

Nov. 12.—The opinion has often been expressed that the end of the present year would terminate the long period of dulness and depression which has been experienced in the Iron Trade, and at present it appears to be probable that this conjecture will be verified. The trade and its branches, indeed, has been improving for some time, especially iron shipbuilding; and although the rates of pig-iron have not advanced much, yet lately prices have been looking up, and gradually hardening. It appears, indeed, to be rather unaccountable that, in the face of regular decreasing stocks, prices should have been kept down so long. The price at which pig-iron has been sold for some time, it is well known, has been far from remunerative. However, on Tuesday affairs looked much brighter at Middlesborough—there was a good attendance at the Exchange, and a decidedly improved tone was evinced. The list prices are as follows:—No. 1, 46s. 6d.; No. 3, 43s.; and No. 4, 42s., net cash. In manufacturing iron there is no marked change, but it is confidently expected that an advance will shortly take place.

It is rather difficult to describe the condition of the Coal Trade; the demand for house and gas coal has certainly improved, and the demand for coking coal is also improving slowly, and, of course, it may be expected to follow the course of the iron trade. The Steam Coal Trade is in the worst position at present. Browne's Export List for October throws some light on the matter, but that must not be held to be conclusive, as the state of the weather rather affected the exports last month. The total exports of coal from the North-Eastern ports, in October, were 412,494 tons, against 461,719 tons in October, 1867, showing a deficiency of 49,225 tons in the present year, that is, so far as this particular month is concerned. So much for the exports. The trade coastwise shows a little deficiency on the same side. The return gives 532,857 tons in October, 1868, against 555,640 tons in Oct., 1867, showing a reduction of 22,783 tons. The deep sinking at Boldon still continues, and what is remarkable a stratum has been met, which if not pure rock-salt contains a great deal of that mineral; it is very hard and compact, and appears to be of considerable thickness.

It was mentioned in this letter some time ago that the committee appointed by the Mining Institute to report on Technical Education had made their report, and also that it was decided to submit the said report to the executive of the Coal Trade Association, and to confer with the latter body as to the course to be pursued. The result is that it has been determined to commence teaching scientific and technical subjects in connection with the Government Department of Arts. This is a step in the right direction, and from which much good may be expected to result, as the rising generation of colliery overmen, &c., will be much better fitted for their duties by the knowledge intended to be imparted so soon as suitable masters can be provided at all the principal colliery centres—that is, at Newcastle, Hetton, Seaham Harbour, Sunderland, Blyth, and other places; probably Walbottle, Marley Hill, &c.

A grand tea and entertainment was given to the workmen at Page Bank Colliery, on Saturday, at which about 450 persons sat down, the proceeds being in aid of a sick fund, to be added to the Miners' Permanent Relief Fund, a branch of which is already established. Mr. Stephenson, of Durham, viewer for the company, who occupied the chair at the public meeting, intimated that Messrs. Bell Brothers had offered 20 per cent. on the whole subscriptions of the society, to be given to the fund, which announcement was received with loud applause. He was glad to see the society progressing so favourably, and hoped it might continue to do so.

Mr. Thos. Clarke, viewer of the Lintz Colliery, who is leaving the neighbourhood, has been presented with a purse of gold by the agents and workmen of the colliery.

NORTHERN INSTITUTE OF MINING ENGINEERS.—At the meeting of this institute, on Saturday, there was a very large attendance of members, the new President, Mr. George Elliot, being in the chair. After the election of members and other routine matters, the main business of the meeting was entered upon—that is, the inaugural address of Mr. Elliot, which was listened to with the greatest attention by the large audience. [A full digest of this elaborate production appears on page 807 of this day's Journal.]

#### REPORT FROM SCOTLAND.

Nov. 11.—Our Pig-Iron market was without much impulse for a few days till yesterday, when it had recovered 3d. a ton of the late decline; and attempts are being again made to "bull" it, so far as it is susceptible under the restricted demand of the closing weeks of the year. A few pence a ton, however, is all that even speculative pressure will effect, and whenever that pressure is withdrawn a rapid relapse ensues. The shipments of the week are a full average, though a small total, being only 8650 tons, as compared with 8340 tons in the corresponding week of last year. Middlesborough iron now reaches an aggregate of 85,000 tons, against 43,500 tons, being a difference of 42,300 tons on the year. To-day "bulls" have again improved their position, and about 8000 tons were done at 53s. 4½d. to 53s. 6d. cash, and 53s. 7½d. to 53s. 9d. a-month; closing, sellers, at 53s. 6d. cash, buyers 1½d. less. No. 1, g.m.b., 53s. 6d.; No. 3, 51s. 3d.; Coltness, No. 1, 50s.; Gartsherrie, 58s. 6d.; Langloan, 54s. Finished iron is in average request, and current quotations are freely paid, and there are hopes of an advance being realised at the beginning of the year. First brands of bars are still quoted 7½; and second, 6½, 12s. 6d. to 6½, 17s. 6d.; angle iron, 7½ to 8½, 10s.; plates (ship), 7½, 17s. 6d. to 9½; boiler, 9½ to 15½. Nail-rod is in extra demand for present shipment, and makers of pig have heavier orders on hand. Iron foundries are less busy, and brass foundries have only limited orders to engage them. Coals have been advanced 6d. a ton since last week, but the market is lifeless on that account. The ironmasters having declined yet to increase their rates is also a cause of depression in this market; but the ironmasters are expected to immediately follow the coalmasters, as they have been forced to concede a similar advance on miners' wages. Quotations are now 6s. 6d. to 8s. a ton, according to quality. Splint coal is a drug in the market, for which there is no present outlet. The Lanarkshire miners have now all received the advance, with but few exceptions, and the pits are idle at these places. In Ayrshire, the miners are not so fortunate, and agitation is being resorted to, to hasten the advance.

At the Geological Society of Glasgow meeting, last week, a paper was read by Mr. Young "On the Section of Strata being worked in the Western Portion of the Gilmerehill Grounds, for the purpose of obtaining Building Stone for the Erection of the New University."

Mr. Young remarked that the chief interest to a geologist of this quarry beyond that of any other in the neighbourhood, consisted in the numerous strata therein exposed, there being no fewer than 26 different beds in a depth of 60 feet from the surface. These consist of five seams of free coal, varying in thickness from 9 to 18 in.; five beds of sandstone, with accompanying strata of clay shale, bituminous shale, fire-clay, and a thin seam of blackband ironstone. The geological position of the strata is in what is known in the Glasgow district as the Possil lower coal and ironstone series, which lie about 510 fathoms under the Upper Red Sandstone of the Lanarkshire coal field. Mr. Young next pointed out the relation which the Possil series bear to the strata of other portions of the Scottish coal field, and stated that they occupy a middle position in the carbon-

iferous limestone series of this country, yet in this district, throughout a thickness of 900 feet, no limestone band or other calcareous strata are found. During the working of the uppermost post of sandstone in the quarry, the workmen came upon the remains of the stumps of five large fossil trees standing in an erect position, the roots being seen extending into a bed of shale upon which they once grew, and which belong to the genus *Sigillaria*, and while they were allowed to remain in position they formed a very interesting object in the quarry.

#### REPORT FROM MONMOUTH AND SOUTH WALES.

Nov. 12.—The Iron Trade of this district is sufficiently brisk to keep the works tolerably well going, and once more the hands are working four and five turns a week, which is generally considered pretty full time. The rail mills are busier than they have been for a considerable time past, although the Russian navigation season has closed, and this fact will tend greatly to allay the fears entertained by many as to there being sufficient orders on makers' books, after the close of the shipping season to the northern ports, to keep the hands employed with anything like regularity. Prices continue firm, and several makers having of late refused some good orders for delivery next year at present rates, strengthens the belief entertained by many competent of forming an opinion that an advance will take place at the commencement of the approaching quarter. The effect of this state of things is that makers are now principally engaged in completing orders on their books, and the turn of events in January next is anxiously looked forward to by all parties interested in the welfare and prosperity of the trade. The refusal to accept forward orders, except at an advance on present prices, is an unmistakable sign of the trade gradually recovering from the depression which has prevailed for the past two years, and establishing itself upon something like a firm basis, and it is generally believed that next year will witness a return to former activity and vigour. Rails are being shipped for South America, and the clearances to that country for some little time to come will be something very considerable, there being several good orders remaining at present on makers' books. The exports to America are steadily increasing, the total clearances during the past month amounting to 14,095 tons. As the Presidential election is now over, and stocks are known to be considerably reduced, several good orders are shortly expected to be received by makers in this district. From India advices are more encouraging than for some three or four months past, and there is now some prospect of trade with that country improving. An average amount of business is being transacted with continental houses, and latest advices are considered favourable as to future requirements, the extension of the railway system in various parts giving a cheering tone to the trade. In addition to the clearances now being made, vessels are wanted to convey rails to Islay or Mollendo, Valparaiso, Kustendje, Tasmania, Salonica, Patras, Nantes, San Francisco, Buenos Ayres, St. John's, and Philadelphia, for all of which good rates are offered. Bars sell freely, chiefly for the east and Continental markets. The Pig-Iron Trade is quiet, and prices have somewhat fluctuated during the past week. For Tin-plates there is a steady demand, but owing to the opening of so many new establishments in the district prices are not firmly adhered to.

The Steam Coal Trade is beginning to exhibit some signs of improvement; but the predictions in previous reports as to the exports for the past month being below the average are fully confirmed by the returns just issued. Unfavourable weather prevailed at short intervals during the whole of the month, and prevented vessels arriving and leaving the local ports, which, together with the reduced purchases of the mail-packet companies, readily account for the falling off in the exports. A large number of vessels entered for the local ports are known to have been detained at the Haven and other ports by the adverse winds which have prevailed; but as a favourable change has taken place in the weather hopes are now entertained that many days will not elapse before the steam coal trade attains a position something like its usual activity and vigour. Large clearances are about to be made to South American ports, and French houses are purchasing considerable quantities. To the Mediterranean ports and continental markets about an average quantity is being sent. For house qualities the demand is improving, consequent upon the increasing coldness of the weather.

The workmen engaged in the Llwynypia Colliery have held their annual soiree at the distribution of prizes given by the Glamorgan Coal Company. About 400 sat down to tea in one of the large sheds at the brick works. The chair was occupied by Mr. H. Begg, the company's local manager, who, on rising to award the prizes, said that that night was the consummation of a year's rivalry, and looking at the standard of comparison for the prizes competed for, the year that had just closed was greatly in advance of former years. He was highly delighted at the energy shown amongst the competitors to carry off prizes, and he was sure it would delight the company to hear that their workmen were competing for the prizes with such zeal, and he had no doubt the company would introduce more prizes to be competed for amongst them. Prizes varying from 12. 10s. to 5s. were awarded for the best-kept cottages and gardens, after which several solos were sung by ladies who were present, and a vote of thanks to the Glamorgan Coal Company brought the meeting to a close.

Mr. John Williams, late forge and mill manager at the Pentrych Iron Works, has been presented with a handsome gold watch and Albert guard. The watch bore the following neatly-engraved inscription:—"Presented to Mr. John Williams by the agents and workmen of the Pentrych Forge and Mill, and a few other friends, as a token of their great esteem and appreciation of his sincere and straightforward conduct while a resident amongst them for four years."

TRADE OF THE SOUTH WALES PORTS.—The following are the returns of the quantity of coal shipped during the month of October, and the corresponding month of last year:—

EXPORTS.	Oct., 1868.	Oct., 1867.
Cardiff.....	Tons 202,052	Tons 206,399
Newport.....	29,991	46,393
Swansea.....	59,369	41,227
Llanelli.....	9,088	10,546
SHIPMENTS COASTWISE.	Oct., 1868.	Oct., 1867.
Cardiff.....	Tons 71,346	Tons 71,346
Newport.....	52,173	63,366
Swansea.....	20,863	26,476
Llanelli.....	13,645	14,955

Newport also exported 9184 tons iron; Cardiff, 16,636 tons iron, and 8697 tons patent fuel; Swansea, 1182 tons iron, and 9004 tons patent fuel. The exports of iron were principally rails, of which New York took no less than 10,269 tons.

MANUFACTURE OF COMPRESSED FUEL.—In his Paris Exhibition report "On Apparatus and Processes of the Art of Mining and Metallurgy," Professor WARINGTON SMYTH remarks that, without being unkindly that several companies have been established in South Wales and elsewhere for a similar manufacture (the manufacture of compressed fuel), we cannot but be conscious that their action is but an infinitesimal set-off against the wholesale waste of slack that takes place in this country. It is not only that the small coal is lost and broken from the saleable part of seams in most of our districts thrown into goaf and gob by the tens of thousands of tons, but those portions of beds, often some feet in thickness, which are intermixed with stone or "sulphur," or which makes a larger than usual proportion of slack, are at once rejected as useless, and acres of such coal are abandoned to be inextricably mixed up with broken roof and heaving floor, although of no worse quality than would be turned to advantage in many a French colliery. It is impossible, in the hard competition of the time, to demand individuals for this sin against the economical use of Nature's gift; but it is a discredit to the country at large, and will, among our descendants, entail many an anathema on the selfish stupidity of their forefathers.

IMPROVEMENTS IN STEAM HAMMERS.—The very compact and efficient steam hammer invented by Mr. DAVID JOY, of Sheffield, is now being successfully introduced into the United States by Mr. G. BIRKBECK, jun., of Broadway, New York. The whole of the working parts usually liable to derangement are kept out of harm's way, by converting the piston rod into the slide valve. The hammer being upon the anvil, steam is admitted through the piston rod to the under side of the piston, which is lifted thereby until the passage connecting above the piston opens to the steam inlet, admitting steam over the piston. Notwithstanding this, the upward stroke continues until the passage which has supplied the steam to the under side reaches the exhaust port. The upper end of the stroke having been reached, the pressure of the steam supplied above the piston combines with the weight of the hammer to carry it down with great force, until the passage connecting with the under side of the piston again reaches the steam inlet. The admission of steam, and consequent speed of the hammer, is regulated and governed by a separate regulating valve, operated by the foot of the workman. A hand-gate also may be placed on the steam pipe if desired. Thus a slow and light blow, or a rapid and heavy one, can be obtained at pleasure. For work requiring rapid and uniform blows, such as drawing small steel, making cutlery or edge tools, planishing saws, &c., this is a very efficient hammer.

UTILISATION OF SEWAGE.—Messrs. SILLAR and WIGNER, of Cornhill, have just issued (through Mr. E. Stock, of Paternoster-row) a pamphlet entitled "The A B C Sewage Process; being a Report of the Experiments hitherto made at Leicester, Tottenham, and Lenington, on the Purification and Utilisation of Sewage." The writers have therein candidly given their opinions and experience on the subject, in order to furnish the public with the necessary information to enable them to form a judgment on the process. The mixture which it is proposed to employ consists of animal charcoal, blood, and clay, which it is stated will, when dissolved in either sewage or water and added to the sewage,

produce an immediate precipitation of the greater part of the injurious matter in the form of large flakes, which rapidly fall to the bottom; the supernatant liquor being then allowed to flow into a tank, a small quantity of a solution of per-chloride of iron is added to it, and this precipitates the sulphuretted hydrogen dissolved in the water, and removes the last traces of smell. In addition to these four ingredients, it has been found desirable to add a proportion of alum, as although the same degree of purity could be obtained without its use, the process is very much accelerated by it, which more than compensates for the small addition of harmless mineral matter to the water. It is claimed that the larger part of the ammonia and all the phosphates are fixed in the residuum, together with about four-fifths of the organic impurities, the deposit, of course, being of great agricultural value, requiring only the addition of a small quantity of acid to render it fit for sale to the farmer. It is considered that more than three-fourths of the London sewage (worth 1,500,000l.) could be utilised by this process, at an expense of not more than one-fourth of its actual money value.

#### FOREIGN MINING AND METALLURGY.

Tables have just appeared in illustration of the commercial movements of Belgium in the first eight months of this year, as compared with the corresponding periods of 1867 and 1866. It appears that the exports of minerals from Belgium to Aug. 31 amounted to 89,782 tons, against 108,580 tons in the corresponding period of 1867, and 113,216 tons in the corresponding period of 1866. The imports of minerals into Belgium to Aug. 31 were 262,255 tons, against 194,212 tons in the corresponding period of 1867, and 214,742 tons in the corresponding period of 1866. The exports of minerals from Belgium thus appear to be diminishing, while the imports are increasing. Since the commencement of 1866 the Belgian mineral basins have displayed sensible symptoms of exhaustion, and the advance attained by the imports shows that Belgium no longer obtains at the same rate the minerals which she requires, but secures a great part of what she wants from France and the Grand Duchy of Luxembourg. The exports of pig from Belgium to Aug. 31 this year were 11,255 tons, against 7138 tons in the corresponding period of 1867, and 11,348 tons in the corresponding period of 1866, while the imports of pig into Belgium to Aug. 31 this year were 28,316 tons, against 38,160 tons in the corresponding period of 1867, and 18,844 tons in the corresponding period of 1866. It results from these figures that at the period at which these statistics stop short the state of the Belgian pig-iron market had sensibly improved as compared with the corresponding period of 1867, the exports showing an augmentation of more than 4000 tons, while the imports present a diminution of nearly 19,000 tons. During the earlier part of this year it must be remembered that commercial affairs were in a very languishing state in Belgium, and that the internal consumption of pig was very restricted; since the commencement of September the general state of affairs has improved, and the internal consumption has increased, although the price of casting pig is kept at a low point in consequence of the low rates current for English pig. The exports of rails from Belgium to Aug. 31 this year amounted to 45,188 tons, or 20,000 tons less than in the corresponding period of 1867, and 3000 tons less than in the corresponding period of 1866. The exports of plates to Aug. 31 this year show little variation, having been 8696 tons, against 8700 tons in the corresponding period of 1867; for the corresponding period of 1866 the exports amounted to 11,885 tons. Of rolled iron, 46,150 tons were exported to Aug. 31 this year, against 38,092 tons in the corresponding period of 1867, and 38,109 tons in the corresponding period of 1866, showing an augmentation of more than 10,000 tons this year. The whole of the exports of metallurgical products—iron, pig, plates, &c.—from Belgium to Aug. 31 this year presented a rather sensible diminution as compared with the corresponding period of 1867, but was 2000 tons more than in the corresponding period of 1866. Annexed are details of the exports made to each country:—

Country.	1868.	1867.	1866.
Russia.....	Tons 33,140	63,118	25,672
Sweden and Norway.....	35	45	192
Denmark.....	852	193	192
Zollverein.....	12,958	3,827	6,562
Hanse Towns.....	2,445	2,237	3,803
Low Countries.....	16,795	16,257	25,108
England.....	6,936	4,079	5,143
France.....	28,948	30,981	36,029
Portugal.....	—	58	1,490
Spain.....	725	88	1,100
Italy.....	5,839	6,254	3,847
Switzerland.....	2,799	1,070	2,000
Austria.....	613	252	364
Roman States.....	—	—	—
Turkey.....	329	509	1,730
Philippine Islands.....	—	—	—
Egypt.....	1,550	—	568
China.....	202	2	118
Singapore.....	—	—	139
United States.....	2,340	910	2,956
Cuba and Porto Rico.....	1,017	369	812
Haiti and Venezuela.....	—	—	99
Brazil.....	162	349	563
Rio de la Plata.....	228	280	813
Chili and Peru.....	530	283	383
Other destinations.....	386	129	112
Total.....	Tons 123,799	131,288	121,188

The state of the Belgian markets has not materially changed during the past week. The last orders for railway materials obtained by the Belgian works have assured the rolling-mills employment for almost the whole of next year; and of the 35,000 tons secured by the Belgian Syndicate of Forges for the North-Eastern Railway of Hungary, the Syndicate has been able to only accept 25,000 tons, since it was stipulated that the whole quantity should be delivered in the first ten months of 1869. The 10,000 tons which the Syndicate has been obliged to abandon have not been wholly lost, however, to Belgium, as they will be supplied by a Charleroi establishment. It is understood that the John Cockerill Company will supply a further quantity of 15,000 tons of rails for Roumania.

The Belgian coal trade has displayed a tendency to increased firmness—in fact, the deliveries have become so active that plant has been made default on the State railways. A sensible amelioration has been observed in the basin of the Couchant de Mons, stocks have been seriously attacked, and the extraction, which has been much restricted, has been considerably developed. Prices present thus far no great alteration, but a sensible improvement is looked for. The exports of coal from Belgium in the first eight months of this year amounted to 2,249,378 tons, as compared with 2,187,900 tons in the corresponding period of 1867, and 2,508,207 tons in the corresponding period of 1866.

There is not much novelty to report in connection with the French iron trade. As has been already stated, the works have orders which assure them employment for several months to come. Prices have acquired considerable firmness, notwithstanding various upward movements which have been noticed of late; and were it not that a certain depression still prevails in St. Dizier rolled iron from charcoal-made pig is quoted at 8½, 10s. to 9½; mixed ditto, 8½, 8s.; and coke-made, 7½, 8s. per ton. Sheets have made 9½, 4s. for first-class, with a scale of 8s. to 10s. per cwt., according to the works. The price of machine iron may be stated thus, according to quality:—No. 20, charcoal-made, 9½, 8s.; No. 20, good quality, 8½, 12s. to 8½, 16s.; No. 20, coke-made, 8½, with a scale of 8s. additional between the numbers 18 and 20. The Champagne Committee of Forgemasters has held one of its periodical meetings; the proceedings were of no great interest, but a letter was read from the Prefecture of the Seine, with reference to a complaint expressed by the committee in respect to the exemption from octroi duties enjoyed by iron and pig manufactured in the new *enclave* of Paris. The official communication, after indicating the difficulties attending the application of the 36th article of an ordinance of Dec. 9, 1814, informed the committee that a project for a modification of the tariff to which iron and pig are now subjected on their entrance into Paris has been under the consideration of the Council of State since 1863. The Champagne committee appeared so satisfied with this scrap of consolation that it instructed its secretary to express to the Prefect of the Seine its gratitude for the able and enlightened administration of which he had given proofs in dealing with the question; some industrialists, on leaving the meeting of the committee, remarked, however, that it was desirable that the Council of State should display a little more activity in the matter. Some important contracts have been concluded of late in Austria. The locomotives required for the Moldavia-Wallachian network have been let by the Lemberg and Czernowitz Railway Company to English and French industrialists at the rate of 2500l. per engine. The house of Sigl, of Vienna, was in competition with the English and French firms who sent in tenders; but the Viennese firm required 3105l. per locomotive, and the difference of 605l. per engine was considered so material that the English and French competitors carried the day. Correspondence from Berlin states that several of the most important German iron-making establishments are about to undertake the manufacture of armour-plates for ships. Hitherto Germany has been a tributary in this respect of foreign powers, but in future it will endeavour to construct its own maritime material. It is proposed to open in the spring great establishments for the construction of the largest ships at Hepsen, in the Bay of Jable: in a word, the North German Confederation is endeavouring to follow the example set by Russia in the matter of shipbuilding. The Longwy district continues to forward iron minerals into the North of Belgium. M. Mineur has just obtained a concession of iron minerals in the neighbourhood of Longwy; the application for a concession was deposited in Sept., 1865, and the decree granting the concession was passed in Sept., 1868, so that it apparently takes three years to obtain a concession of minerals in France. Nothing is known at present as to a concession applied for by the Denain and Anzin Company. The Moselle district has sold plates at 7½, 4s. per ton, delivered in the Luxembourg (the import charges remaining at the charge of sellers). It appears that orders for conduit pipes are so heavy that they are executed with difficulty, and the same may be said with respect to plates. M. Kecher and Westermann are furnishing the iron required for the works of the canal lateral to the Moselle; specimens of the iron proposed to be supplied have been tested by the engineers of the canal, and the result has been satisfactory. The Moselle district has been forwarding plates of late to Montlucon, although the transport expenses are very heavy. The Paris, Lyons, and Mediterranean Railway is beginning to employ Bessemer cast-steel tyres to a considerable extent. The Eastern of France Railway Company is about to try simultaneously locomotive tyres of Krupp steel and Bessemer steel of French manufacture.

MINING IN SOUTH AUSTRALIA.—The prospects of the several properties worked by the Yorke Peninsula Mining Company appear, from the latest advices received in the colony, to be very satisfactory. The Kurilla section, it will be remembered, was originally taken up by the Bon Accord Company, who, in due time, struck a lode parallel to the Wallaroo, which, at 25 fms., spread out into 7 ft. wide, and produced some tons of 25 per cent. ore, and the Bon Accord Company became absorbed in the Yorke Peninsula Mining Company, who also bought up the New Devon and Durryea claims. The Kurilla group comprises half-a-dozen sections, of which four immediately face the Wallaroo Mine. The Kurilla lodes run east and west, with an underlie northwards. Hall's engine-shaft, the principal shaft at present at work, is about ½ mile south from the



Wallaroo lode, and is down a few fathoms below the 35, levels having been driven eastward at 15, 25, and 35 fathoms. At the 35 fm. level the lode shows a width of 2½ ft., and is worth 1½ ton of 20 cent. ore per fathom. Four men are here stopping, and four driving eastward. Near this place a junction has been discovered which must turn out to be a branch lode of the New Devon coming from the westward. The shaft will be continued as soon as possible to the 45, and the ores taken out of it give, in their steadily improving quality, every inducement to proceed with vigour. In the winze from the 25 to the 35 the lode is 4 ft. wide, yielding 2 tons per fathom of about 15 per cent. ore. The mine is coming into operation again after fully a year's suspension: 18 hands are employed. Capt. Anthony, late of the Yudanmutana, the superintendent, has rendered important services to the mining interests of the colony, not only as a miner, but as a smelter. Every month he contrives to increase his supply of ore, and to increase its quality. In July last he sent away about 16 tons; August, 30 tons; and by the second week in September he had fully 20 tons on the floors. It has averaged 18 per cent. all round, the latest raisings from the shaft having run considerably higher. The stratification in the Kurilla has been throughout similar to that of its neighbours, beginning with green ores, next changing to black and grey oxides, and then settling down into yellow sulphurets. Outwardly, the Duryea is still one of the smartest-looking places on the Peninsula. It has the largest heap of "deads" round the mouth of the shaft. Its engine-house is the neatest within sight, and its low-pressure engine is one of the best ever imported. The furnaces are still full of ashes, as if they had gone out only yesterday. The surrounding cottages are still tenanted with people who bustle about as if they were to resume work in course of the afternoon. The wharf is still standing, with most of the gear attached to it, as if the bucket had been taken off for some trifling repairs. Nevertheless, the Duryea is abandoned—"knocked," as Cornishmen say—and its corpse is, we observe, valued by its present owners at the low price of 1100*l.* odd. If road metal ever comes to be worth 20*l.* a ton—which is not improbable, if the Central Road Board be spared in its career of usefulness—the Duryea may yet realise its destiny. At present it is a victim to the absurd prejudices of smelters against mundic.

#### MINING, AND THE PRESENT POSITION OF THE METAL MARKET—No. III.

TO THE EDITOR OF THE MINING JOURNAL.

SIR,—In my last letter I endeavoured to establish some statements previously made by me in your columns as to the profitable character of legitimate mining. My letter has, happily, been noticed in various quarters, and questions have been addressed to me by letter, as well as *via voce*, as to whether I had not made some mistake in some of the instances which I gave as to the enormous profits which followed very small investments. In other communications made to me I have been asked whether, assuming my statements to be correct, I had not exhausted the list of such splendid investments. And another class of correspondents have suggested that the like cannot happen again, as the mines of Cornwall cannot be worked remuneratively at the great depth at which they must now be. I can aver that no mistake has occurred in the statistics which I presented. I can assure my correspondents that I have by no means exhausted the list of great mines which pour, or have poured, forth their treasures upon an outlay so small as naturally to excite the wonder of persons not conversant with the history of mines and mining. The circumstance ought to excite the admiration as well as wonder of such persons, and lead them to give to this department of industrial investment their attention, and even preference. As to the future, there can be no doubt that Cornwall has prosperity in store for her whenever the general business of the country possesses an average success. In seasons of monetary panic, when confidence is paralysed, and money is hoarded by the investing classes under a general contagion of timidity, mining must suffer, and the mines which from depth or any other cause are most costly will be least remunerative, but assuming business throughout the country to be in its normal condition, then the deep mines, which are often rich in proportion to their depth, will be, as they so often have been, fountains of treasure.

Permit me, Sir, to prove that I have not exaggerated the productive value of British mines, by affording to your readers additional evidence of the fact. This can be done by selecting instances of mines not now worked, as well as of those now yielding vast quantities of ore. It has been often asserted that the mines of Cornwall are exhausted, but from a careful analysis of the mining catalogue of the county it appears that only a few mines, (say) five or six, have gone beyond the depth of 300 fathoms, from 12 to 15 beyond 200 fathoms and less than 300, about 60 have gone to a depth below 200 fathoms but above 100, while there are no less than 400 that have not reached even 100 fathoms, and out of these half scarcely average 50. The inference fairly is that, instead of the mines being exhausted, they have scarcely begun to be worked. It is reasonable to believe that if those mines yet in their infancy had been worked extensively their returns would not have compared unfavourably with those which have been wrought on the largest scale. By far the most profitable mines in Cornwall are the deepest, such as Tresavean, Great Wheal Vor, Dolcoath, Fowey Consols, Par Consols, &c. Take the case of Wheal Neptune, in the western part of Cornwall, in sight of the celebrated St. Michael's Mount, only worked to a depth of 110 fathoms. This mine made a profit to the company of 128,000*l.* upon a comparatively small outlay. If this capital, or a part of it, had been employed to sink and work on a scale commensurate with the great and deep mines of the county there is every probability that it would be still making large dividends.

The expense of working deep mines has been considerably exaggerated. The average expense of driving levels is about 7*l.* per fm., and that of sinking shafts rather more than double that, irrespective of the value of any ore extracted. Frequently very little money is employed in this way, or in any way, while large returns are made to the companies working them. The East Wheal Rose, a celebrated Cornish lead mine, long idle, except as to what has been done at the surface in extracting some lead from the halvans, paid 400,000*l.* profit to the first company which worked it. The total amount paid per share was 50*l.*; the number of shares was 128. In the year 1845 the shareholders received 827 per cent. dividends, and during 11 years the lowest percentage was 46. The Great Wheal Alfred Copper Mine, in Phillach, yielded a profit of 100,000*l.* in the first working. East Crinnis and South Par, in St. Austell, yielded the first company which worked it 100,000*l.* profit.

In my last letter I stated the percentage paid on the investment made by a number of mines, I will now show the total amount of dividends paid by some of these and others. Beauchamp and Buller, 120,000*l.*; Penstruthal, 130,000*l.*; Wheal Jewell, 250,000*l.*; Wheal Damsell, 180,000*l.*; Wheal Gorland, 150,000*l.*; Treskerby, 200,000*l.*; Trethellan, 48,000*l.*; Treviskey and Barrier, 37,000*l.*; United Mines, 1,109,828*l.*; Wheal Unity, 330,000*l.*; Maid, 40,000*l.*; Poldice, 200,000*l.*; The Tang, 50,000*l.*; Godolphin, in Breage, Cornwall, gave during the first working 90,000*l.* profit; Par Consols has been a very profitable mine, on an average Fowey Consols during 20 years paid 25 per cent. Phoenix, in Liskinhorne, Cornwall, has paid 12 per cent.; it has made dividends in about a dozen years to the extent of 100,000*l.* Tresavean is a very remarkable instance of the great advantages offered by working the metallic mines of Cornwall. With an outlay of little more than 1000*l.* its great wealth was brought to light. From the year 1814 to June, 1848, it yielded copper ore to the value of 1,800,000*l.* (in round numbers); of this large sum about 800,000*l.* was clear profit. The new company have realised nearly half a million sterling. In the year 1833 the amount paid up per share was 20*l.*; the value of the shares was then 2000*l.* each. The Devon Great Consols, however, passed even the magnitude of such advantage, in its marvellous career of success, for on an outlay of 1024*l.*, it has paid 1,141,760*l.* On an outlay of 3120*l.*, Tresavean paid 450,000*l.* dividends. Basset, on an outlay of 2624*l.*, paid 323,000*l.* sterling dividends. Buller yielded nearly as much upon a still smaller outlay. Before 10,000*l.* was laid out upon South Frances, 143,000*l.* was returned. Basset, upon an outlay a little less, yielded more than eight times that cost. Levant, upon 1300*l.* expenditure, returned 140,000*l.* in dividends. South Caradon returned 300,000*l.* upon an expenditure of 640*l.* West Wheal Seton, with less than 2000*l.*, has paid close upon 250,000*l.* At Dolcoath, which is a deep mine, less than 50,000*l.* have been expended, and more than 300,000*l.* have been returned. Wheal Frances made, with 9000*l.*, 20 times that amount. Tincroft, upon an outlay of 54,000*l.*, gave 118,800*l.* Botallack has given 97,750*l.* to the shareholders, on an expenditure of 18,360*l.* East Pool spent a little over 3000*l.*, and gave the proprietary 56,640*l.* It is quite unnecessary, Mr. Editor, to go further into these details. These are facts, independent of the fluctuating price of shares in the market, as the "bulls" gore the "bears," or the "bears" squeeze the "bulls." It is to the progressive development of the metallic mines that the investor should look. He ought not to be described as engaged in mining, or as having invested in a mine, who is merely a trafficker in the variable values on the exchanges, irrespective altogether of the true value of the com-

modity ostensibly represented, and the name of which is literally often borrowed for mere gambling purposes. A gentleman, a member of a very powerful firm in Cornwall, interested in over 100 mines, lately declared to me that he never takes notice of the telegrams sent to him by shareholders, or of the quotations on the stock and mining share markets. What he looks at and ponders deeply is the report of the engineers and mining captains of the development and character of the mine itself. This is the true mode of procedure. The reports made by competent persons at the mine itself is the true test for the investor. All emblazements and puffs are valueless in connection with mines. The reports are invaluable. If we had the monthly reports of the various mines in Cornwall during 200 years, as we have had in your columns for 30 years, it would be one of the most interesting and important volumes, or series of volumes, which ever enriched the shelves of a private gentleman or public institution. We should have materials for comparison as to cost and returns, and the character and quality of the development of those properties during progressive operations. It would be alike worthful to the man of science, the practical miner, and the investor. I trust, Mr. Editor, that I have made good my assertion that there is no form of investment open to British capitalists which has been so profitable, and in which, at the same time, the investor can so clearly judge of prospects and probable results.—Gresham House. THOMAS SPARGO.

#### In the Court of the Vice-Warden of the Stannaries. Stannaries of Cornwall.

IN the MATTER of the COMPANIES ACT, 1862, and of the GREAT TREGUEN CONSOLS MINING COMPANY.—By the direction of His Honor the Vice-Warden, notice is hereby given that on Monday, the 23d day of November inst., at the Registrar's Office, Truro, in the county of Cornwall, at Eleven o'clock in the forenoon, this Court will PROCEED to MAKE a CALL of THREE SHILLINGS AND NINE PENCE PER SHARE on all the contributions settled on the List of Contributors of the above-named company under Class A. All persons interested therein are entitled to attend at the time and place aforesaid to offer objections to such call.

W. MICHELL, Registrar of the said Court.

Dated Registrar's Office, Truro, the 5th day of November, 1868.

#### In the Matter of the Companies Act, 1862, AND IN THE MATTER OF THE HENDRE LEAD MINING COMPANY (LIMITED) MOLD, FLINTSHIRE.

POWERFUL and COSTLY MACHINERY, of the most expensive description and in complete working order, together with the MINING APPARATUS, TOOLS, STORES, and MATERIALS, in One Lot.

A Lease of the Mine may be had from the Landlord on favourable terms.

MESSRS. J. AND E. BADDELEY are directed by the Liquidators TO SELL BY AUCTION, at the Auction Mart, Tokenhouse-yard, London, on Friday, November 20, at Two o'clock for One, in One Lot, the VALUABLE PLANT and MACHINERY on the WORKS of

#### THE HENDRE MINE,

About four miles from MOLD, in the county of FLINT, comprising a 900-horse power CORNISH PUMPING ENGINE, with 100 in. cylinder, and 11 ft. stroke; a 576-horse power CONDENSING ENGINE, with 80 in. cylinder, and 10 ft. stroke; a 24-horse power CONDENSING ENGINE, with 22 in. cylinder, and 5 ft. stroke; a 36-horse power horizontal high-pressure ENGINE, two smaller ENGINES; seven 35 ft. cylindrical BOILERS; four 30 ft. tubular BOILERS; one 15 ft. ditto; a steam crusher, hydraulic lifting pumps, patent 8 ton weighing machine, powerful winches, screws, fittings of pits, iron ladders, wire rope, 30 tons of castings, &c., lathes, and other tools, quantity of timber, and effects. The property may be viewed, by order only, to be obtained of the auctioneers, and particulars may be had on application to the captain of the mine, on the premises; and in London, of T. H. LAMONT, Esq., solicitor to the liquidators, 30, Lower Thames-street; and of Messrs. J. and E. BADDELEY, auctioneers and surveyors, 26, Bishopsgate Within, City, E.C.

#### LLYFNANT SLATE QUARRY, MONTGOMERYSHIRE, NORTH WALES.

MR. GEO. A. H. POTTER, Auctioneer and Valuer, has been instructed TO SELL the ABOVE, BY PRIVATE TREATY, near the Railway, and close to the River.

Full particulars sent on application to the Auctioneer, 17, Orange-street, Swansea, South Wales.

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EXTENSIVE and VALUABLE LEASEHOLD PROPERTY, held under lease from the Marquis of Waterford, EXPRESSLY for OPENING UP the EXTENSIVE SLATE BED which traverses the MOUNTAIN RANGE, called "THE COMERAGHS," on the LANDS of CLONDONNELL, county of WATERFORD, within four statute miles of KILSHEELAN, where there is every facility for sending off slates by boat or rail, either for sea or inland trade.

A good deal of work has been done, and slates got; but, compared with the extent of this slate property, it may be called a trial only, yet sufficient to prove to those versed in such business that there is good slate and a large field for extensive operations. The ground rises about 1 in 3 to 700 feet, and no machinery wanted for hauling; water for dressing-machines can be had at all times, and from a very high fall.

None but principals dealt with.

Address, GEORGE MOORE, Esq., Coolfin, Portlaw, County Waterford.

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FOR SALE, BY PRIVATE CONTRACT, THE LEASE (17 years unexpired) of this MINE, together with the VALUABLE MACHINERY, PLANT, and MATERIALS thereon.

The Gorn Mine has yielded large quantities of lead, and will, with comparatively small outlay, no doubt, become dividend-paying at an early period. The exploration of the property has been suspended mainly in consequence of the death of one of the largest shareholders; but should speculators, knowing the merits of the mine, be disposed to co-operate in its future development, the present company would treat with them on equitable terms.

Address, "Secretary of the Gorn Mine," MINING JOURNAL Office, 26, Fleet-street, London, E.C.

#### NORTH WALES—QUEEN'S FERRY, FLINT. CLOSE TO THE RAILWAY.

TO BE SOLD OR LET, DESIRABLE FREEHOLD MANUFACTURING PREMISES, with ENGINE-POWER and LAND.—A plot of about one acre, with substantial factories, engine-house chimneys, stable, outbuildings, and sheds, suitable for any manufacturing purpose. ENGINE of most recent construction, and BOILER nearly new.

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#### FOR SALE.—A FIRST-CLASS SECONDHAND 8-horse power PORTABLE STEAM-ENGINE, of recent construction, by eminent makers.

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STEAM-BOILERS made by WILLIAM WILSON, LILYBANK BOILER WORKS, GLASGOW, on the most improved principles, for home and export. All boilers made of the best material and workmanship, proved and warranted tight under a high pressure, and delivered at any railway station or shipping port in the kingdom at moderate rates. Lithograph of boilers forwarded post-free on application.

#### IN THE TOWER FOUNDRY IS THE TYNE DEPOT FOR MACHINERY of every description for WOOD and IRONSTONE, CORN-CRUSHING, and PUG MILLS. Also, AGRICULTURAL IMPLEMENTS.

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Mem. Soc. Arts, Assoc. Soc. Engineers, Compiler of the "Inventors' Almanac," and the Author of the "Defence of the Patent Law."

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MESSRS. G. W. AND T. CRAIK ARE PREPARED TO SUPPLY COAL AND COKE WAGONS OF EVERY DESCRIPTION, Either for cash, or by deferred payments through wagon-leasing companies. WAGONS PROMPTLY REPAIRED.

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RAILS OF PERMANENT WAY, CONTRACTORS' AND COLLIERY SECTIONS, CHAIRS, FISH-PLATES, SWITCHES, AND CROSSINGS. Sundry lots of RAILS, suitable for sidings, &c., ON SALE, by—Mr. ROBERT WRIGHTSON, NEWPORT, MONMOUTHSHIRE.

MILNER'S STRONG HOLDFAST AND FIRE-RESISTING SAFES, CHESTS, DOORS, AND STRONG ROOMS, With the progressive and recent improvements effected after half a century's experience, effectually guard against FIRE and BURGLARS. LIVERPOOL, MANCHESTER, SHEFFIELD, LEEDS, HULL, and 47A, MOORGATE STREET, CITY, LONDON.

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MESSRS. WESTON AND COLLINGBORN SOLICIT ORDERS for SOFT PIG LEAD, which they are producing of the very best quality. Prices on application. WORKS—SWINFORD, GLOUCESTERSHIRE. OFFICE,—18, PETER STREET, BRISTOL.

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Which have been proved INEXPLOSIVE in the highest obtainable current of gas, of 48 ft. per second. No. 1 weighs 24 ozs., is simple in its construction, burns with a steady and nearly uniform flame in moderate currents, gives a good light, and is in every respect a practicable lamp. Price, 9s. each; if in quantities of a dozen or upwards, 8s. 6d. each, delivered free. Orders received by—WILLIAM HANN AND SON, HETTON COLLIERY, FENCE HOUSES.

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MANUFACTURER OF MINING AND SURVEYING INSTRUMENTS, DERBY.

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Price List on application. STERNE'S PATENT PNEUMATIC SPRINGS FOR COAL CAGES. Price £8 10s. per set of four.

#### IMPORTANT TO ENGINEERS AND FOUNDERS, FOR POLISHING BRASS, STEEL, and other purposes; also IMPORTANT as KNIFE POWDER.

#### MAGNETIC ORE PULVERISED.

Considerable quantity of the above ore TO BE SOLD, BY PRIVATE CONTRACT. Samples and prices may be had on application to Mr. THOMAS SCOTT Mount Pleasant, Dolgelly.

#### SMITH AND FORREST,

ROBIN DISTILLERS, GREASE AND VARNISH MANUFACTURERS, HOLT TOWN OIL WORKS, MANCHESTER, MANUFACTURERS OF VEGETABLE OILS, &c.

ANTI-FRICTION GREASE, 10s. to 14s. per cwt.

Wire rope ditto, free from acid, 15s. per cwt. Liquid ditto (between thick and thin), for trams, &c., 8s. to 12s. per cwt.

SKIP, HUTCH, CORVE, and WAGON OILS, from 8s. to 12s. per cwt.

TORCH OIL, 1s. to 1s. 6d. per gallon.

COPPER-SPOUTED QUART LAMPS, 4s.; TORCH WICK for ditto, 6d. per lb. PATENT ANTI-CORROSION BLACK VARNISH. "Paint Substitute for Wood or Iron," ready for use, 1s. to 2s. 6d. per gallon. We shall be glad to furnish a detailed price-list on application. Orders by post receive prompt attention.

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Illustrated catalogue of useful inventions, 6 stamps.

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#### IMPROVED PNEUMATIC TUNNELLING ENGINE.

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## Contracts for Fresh Ox Beef.

CONTRACT DEPARTMENT, ADMIRALTY, SOMERSET HOUSE.

**THE COMMISSIONERS** for Executing the Office of Lord High Admiral of the United Kingdom of Great Britain and Ireland, do hereby give notice that on **TUESDAY**, the 1st December next, at Twelve o'clock at noon, they will be **READY TO TREAT** with such persons as may be **WILLING TO CONTRACT FOR SUPPLYING** (under separate contracts) all such quantities of **FRESH OX BEEF**

As may be demanded for the use of Her Majesty's ships and vessels at the following places, from the 1st January to the 30th June, 1869, both days included, viz.:

Berwick	ENGLAND, &c.	Plymouth (oxen)
Cowes	Jersey and Guernsey	Portsmouth (ditto)
Dartmouth	Littlehampton	Sheerness (ditto)
Exmouth	Liverpool	Ramsgate
Falmouth	London Bridge to Woolwich, inclusive	Seilly
Fleetwood	Lymington	Southampton
Gravesend	Millford Haven, Pembroke, and Pater	Swansea
Greenhithe	Nedley	Weymouth
Harwich	Newhaven	Whitstable
Holyhead	Penzance	Wymouth (North).
Hull, Hawke Roads, and in the Humber	Portland and Portland Roads	

Aldershalg	SCOTLAND.	Granton
Greenock		Queensferry.
Bantry	IRELAND.	Queensdown and Kinsale
Belfast & Carrickfergus	Killbeggs	Rathmullen
Castletownsend	Kingstown and Dublin	Valentia
Foyes	Limerick	Waterford
Galway	Lough Foyle	Westport.
Kilrush	Lough Swilly	
	Mill Cove (Berehaven)	

N.B.—The contractors are to supply good, fat, well-fed Ox Beef, as NO HEIFER MEAT will be admitted.

The Lords Commissioners of the Admiralty reserve to themselves an unlimited power of selection in accepting the tenders.

Particular attention is called to the revised conditions of the Sheerness Contract, which is to include supplies to all ships and vessels between Chatham and the Great Nore, both inclusive; also the Naval Barracks at Sheerness.

Parties tendering for Portsmouth, Plymouth, and Sheerness are to specify in their tenders a rate per 100 lbs. for live oxen, delivered in the usual manner; and no attention will be paid to any offers not so made.

Separate tenders must be made for each port, and at a rate per 100 lbs., and no attention will be paid to any offers not so made. Contractors, in claiming payment for the supplies of beef, are to make out their invoices in pounds at per 100 lbs.

The cattle under the Sheerness contract to be slaughtered in the Admiralty slaughter-house at Sheerness, for Falmouth on the spot, and for Portland not farther from that port than Weymouth; the contractors for Portland and Dartmouth are also to deliver the meat on board H.M. ships and vessels.

The contractors for Portland and Weymouth are to reside at Portland or Weymouth.

The contractor for any of the other places is to reside on the spot, or to have an agent resident there, whose name and address must be given on the tender.

Conditions of the contracts may be seen in the lobby of the Department of the Controller of Victualling, Admiralty, Somerset House, W.C.; or by applying to the superintendents of the victualling establishments at Deptford, Gosport, and Plymouth; the superintendents of Her Majesty's Dockyards at Woolwich, Chatham, Sheerness, and Pembroke; the Naval and Victualling Storekeeper at Haulbowline; the officers conducting the packet service at Liverpool and Southampton; the Secretary to the Postmaster-General, Dublin; to the collectors of Her Majesty's Customs at

Belfast	Harwich	Ramsgate
Berwick	Hull	Seilly
Cowes	Jersey and Guernsey	Swansea
Dartmouth	Londonderry (for	Waterford
Falmouth	Lough Foyle and	Westport
Fleetwood	Lough Swilly)	Weymouth
Galway	Newhaven	Yarmouth.
Greenock	Penzance	

And to the postmasters at each of the other places.

Forms of tender may also be obtained on application at the lobby of the Department above mentioned, or to the proper officers at either of the above places. No tender will be received after Twelve o'clock at noon on the day of treaty, nor any notified unless made on the printed form provided for the purpose; but it will not be necessary that the party tendering or an agent appointed by him should attend at this office, as the result of the offer received from each person will be communicated to him and to his proposed sureties in writing.

Every tender must be delivered at the Department of the Controller of Victualling, Admiralty, Somerset House, and signed by two responsible persons, engaging to become bound with the person tendering in the sum of £1500 for the due performance of each of the contracts for Sheerness, Portsmouth, Plymouth, and Queenstown and Kinsale; and in the sum of £300 for each of the other contracts.

The contractors to pay half the amount of the stamps on their contracts and bonds.

By order, **ANTONIO BRADY**,  
Registrar of Contracts and Public Securities.

Contract Department, Admiralty, Somerset House, Nov. 5, 1868.

## Contracts for Vegetables.

CONTRACT DEPARTMENT, ADMIRALTY, SOMERSET HOUSE.

**THE COMMISSIONERS** for Executing the Office of Lord High Admiral of the United Kingdom of Great Britain and Ireland, do hereby give notice that on **TUESDAY**, the 1st December next, at Twelve o'clock at noon, they will be **READY TO TREAT** with such persons as may be **WILLING TO CONTRACT FOR SUPPLYING** all such quantities of **VEGETABLES**

As may be demanded for the use of Her Majesty's ships and vessels at the following places, from the 1st April, 1869, to the 31st March, 1872, both days included, viz.:

Berwick	ENGLAND, &c.	Plymouth
Chatham to Gillingham, inclusive	Hull, Hawke Roads, Jersey and Guernsey	Sheerness, from below Gillingham to the Great Nore, inclusive
Cowes	Littlehampton	Ramsgate
Dartmouth	Liverpool	Southampton
Exmouth	London Bridge to Woolwich, inclusive	Swansea
Falmouth	Millford Haven, Pembroke, and Pater	Weymouth
Gravesend	Nedley	Whitstable
Greenhithe	Newhaven	Wymouth (North).
Harwich	Penzance	
Holyhead	Portland and Portland Roads	

Granton	SCOTLAND.	Queensferry.
Greenock		
Bantry	IRELAND.	Tarbert
Belfast	Kingstown and Dublin	Waterford
Galway	Lough Foyle	Westport.
Kilrush	Mill Cove (Berehaven)	
	Queenstown & Kinsale	

Separate tenders must be made for each port, and at a rate per 100 lbs. instead of at per cwt., and no attention will be paid to any offers not so made. Contractors in claiming payment for vegetables supplied are to make out their invoices in pounds at per 100 lbs.

The Lords Commissioners of the Admiralty reserve to themselves an unlimited power of selection in accepting the tenders.

Conditions of the contracts may be seen in the lobby of the Department of the Controller of Victualling, Admiralty, Somerset House, W.C.; or by applying to the superintendents of the victualling establishments at Deptford, Gosport, and Plymouth; the superintendents of Her Majesty's Dockyards at Woolwich, Chatham, Sheerness, and Pembroke; the Naval and Victualling Storekeeper at Haulbowline; the officers conducting the packet service at Liverpool and Southampton; the Secretary to the Postmaster-General, Dublin; to the collectors of Her Majesty's Customs at

Belfast	Greenock	Ramsgate
Berwick	Hull	Swansea
Cowes	Jersey and Guernsey	Waterford
Dartmouth	Londonderry (for	Westport
Falmouth	Lough Foyle)	Weymouth
Galway	Newhaven	Yarmouth.

And to the postmasters at each of the other places.

Forms of tender may also be obtained on application at the lobby of the Department above mentioned, or to the proper officer at either of the above places. No tender will be received after Twelve o'clock on the day of treaty, nor any notified unless made on the printed form provided for the purpose; but it will not be necessary that the party tendering, or an agent appointed by him, should attend at this office, as the result of the offer received from each person will be communicated to him and his proposed sureties in writing.

Every tender must be delivered to the Department of the Controller of Victualling, Admiralty, Somerset House, and signed by two responsible persons, engaging to become bound with the person tendering in the sum of £100 for each of the contracts.

The contractors to pay half the amount of the stamps on their contracts and bonds.

By order, **ANTONIO BRADY**,  
Registrar of Contracts and Public Securities.

Contract Department, Admiralty, Somerset House, Nov. 5, 1868.

**JOHN AND EDWIN WRIGHT,**



**PATENTEE'S.**  
(ESTABLISHED 1770.)  
**MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED**

**PATENT FLAT AND ROUND WIRE ROPES,**  
From the very best quality of charcoal iron and steel wire.

**PATENT FLAT AND ROUND HEMP ROPES.**  
**SHIPS' RIGGING, SIGNAL AND FENCING STRAND, LIGHTNING CONDUCTORS, STEAM PLOUGH ROPES** (made from Webster and Horsfall's patent steel wire), **HEMP, FLAX, ENGINE YARN, COTTON WASTE, TARPULING, OIL SHEETS, BRATTICE CLOTHS, &c.**

**UNIVERSE WORKS, MILLWALL, POPLAR, LONDON.**  
**UNIVERSE WORKS, GARRISON STREET, BIRMINGHAM.**  
**CITY OFFICE No. 5, LEADENHALL STREET, LONDON, E.C.**

## IMMENSE SAVING OF LABOUR.

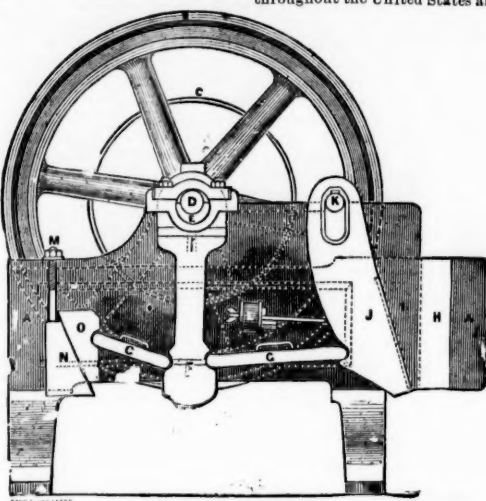
TO MINERS, IRONMASTERS, MANUFACTURING CHEMISTS, RAILWAY COMPANIES, EMERY AND FLINT GRINDERS, MCADAM ROAD MAKERS, &amp;c., &amp;c.

**BLAKE'S PATENT STONE BREAKER,**

OR ORE CRUSHING MACHINE,

FOR REDUCING TO SMALL FRAGMENTS ROCKS, ORES, AND MINERALS OF EVERY KIND.

It is rapidly making its way to all parts of the globe, being now in profitable use in California, Washoe, Lake Superior, Australia, Cuba, Chili, Brazil, and throughout the United States and England. Read extracts of testimonials:—



*The Parys Mines Company, Parys Mines, near Bangor, June 6.*—We have had one of your stone breakers in use during the last twelve months, and Captain Morcom reports most favourably as to its capabilities of crushing the materials to the required size, and its great economy in doing away with manual labour. For the Parys Mining Company, **JAMES WILLIAMS**,  
**H. R. Marsden, Esq.**

*Eaton Emery Works, Manchester.*—We have used Blake's patent stone breaker made by you, for the last 12 months, crushing emery, &c., and it has given every satisfaction. Some time after starting the machine a piece of the moveable jaw about 20 lbs. weight, chilled cast-iron, broke off, and was crushed in the jaws of the machine to the size fixed for crushing the emery. For the Parys Mining Company, **JAMES WILLIAMS**,  
**H. R. Marsden, Esq.**

*Alkali Works, near Wednesbury.*—I at first thought the outlay too much for so simple an article, but now think it money well spent. **WILLIAM HUNT**.

*Welsh Gold Mining Company, Dolgelly.*—The stone breaker does its work admirably, crushing the hardest stones and quartz. **WM. DANIEL**.

*Our 15 by 7 in. machine has broken 4 tons of hard whinstone in 20 minutes, for fine road metal, free from dust.* **Messrs. ORD and MADDISON, Stone and Lime Merchants, Darlington.**

*Kirkless Hall, near Wigan.*—Each of my machines breaks from 100 to 120 tons of limestone or ore per day (10 hours), at a saving of 4d. per ton. **JOHN LANCASTER**.

*Ovoca, Ireland.*—My crusher does its work most satisfactorily. It will break 10 tons of the hardest copper ore stone per hour. **WM. G. ROBERTS**.

*General Frémont's Mines, California.*—The 15 by 7 in. machine effects a saving of the labour of about 30 men, or \$75 per day. The high estimation in which we hold your invention is shown by the fact that Mr. Park has just ordered a third machine for this estate. **SILAS WILLIAMS**.

For circulars and testimonials, apply to—

**H. R. MARSDEN, SOHO FOUNDRY,**

MEADOW LANE, LEEDS,

ONLY MAKER IN THE UNITED KINGDOM.

## CAUTION!

**BLAKE'S PATENT STONE BREAKER,**

In Chancery.

**BLAKE v. ARCHER, NOVEMBER 12, 1867.**

His Honour the Vice-Chancellor WOOD having found a VERDICT in FAVOUR of the PLAINTIFFS in the above Cause, establishing the VALIDITY of BLAKE'S PATENT, and made a DECREE for an INJUNCTION to RESTRAIN the DEFENDANTS, Messrs. THOMAS ARCHER and SON, of Dunston Engine-Works, near Gateshead-on-Tyne, from INFRINGING such PATENT, and ordering them to pay to the Plaintiffs the costs of the Suit.

ALL PERSONS are hereby CAUTIONED against MANUFACTURING, SELLING, or USING any STONE BREAKERS similar to BLAKE'S, which have not been manufactured by the Plaintiffs. Application will forthwith be made to the Court of Chancery for INJUNCTIONS AGAINST ALL PERSONS who may be found INFRINGING BLAKE'S PATENT after this notice.

SOLE MAKER IN ENGLAND,

**H. R. MARSDEN, SOHO FOUNDRY, MEADOW LANE, LEEDS.**

PARIS EXHIBITION, 1867. SILVER MEDALS, CLASSES 40-51.

**AWARDED THE ONLY FIRST-CLASS MEDAL FOR CRUCIBLES.**

THE  
**PATENT PLUMBAGO CRUCIBLE COMPANY,**  
SOLE MANUFACTURERS UNDER MORGAN'S PATENT,  
**BATTERSEA WORKS, LONDON, S.W.**

These Crucibles (MORGAN'S PATENT) were the only ones to which Prize Medals were awarded in London, 1862; Dublin 1865; New Zealand, 1865; and Oporto, 1865.

They have been in use for many years in the English, Colonial, French, and other Foreign Mints; the English, French, and other Arsenals; and have been adopted by most of the large Engineers, Founders, and Refiners at Home and Abroad.

The capabilities which have now for more than twelve years distinguished these Crucibles are:— Their average durability for Gold, Silver, Copper, and other ordinary metals is forty to fifty pourings, in some cases reaching one hundred. They never crack, and heat more rapidly than any other kind. One annealing only is required. Change of temperature has no effect. They can when hot from the furnace be dipped in cold water with safety. The saving of labour and metal is very great. (Messrs. BREEDEN and BOOTH, Birmingham, testify to the saving of 1 ton 2 qrs. 21 lbs. 4 ozs. of metal in melting 7½ tons & cwt. of brass.) In Steel Melting the saving of fuel has been demonstrated to amount to a ton and a half to every ton of steel fused. For Zinc they last longer than iron pots, and save the great loss which arises from mixture with iron. Those for Malleable Cast-iron show an average working of seven days, doing each day nearly double the work of any other crucible.

As these crucibles last much longer than any others, it follows that the saving of metal must be great, because to each worn crucible a quantity of metal adheres. In fact, comparing these with other crucibles, the saving of metal and fuel alone is more than equivalent to their cost.



A are made in sizes varying from 2 ozs. to any required capacity, and are marked by the quantity of kilogrammes they will contain; thus No. 100 will contain 100 kilogrammes.  
B differ in shape, but correspond in all other respects with A, and are similarly marked.  
C are marked in English pounds—thus, a crucible marked 60 will contain 60 lbs.  
D are made expressly for steel in various sizes.

**MORGAN'S PATENT CRUCIBLES**

Can be made any shape or size required, and are stamped as below:—

Having secured new Patents

for our Manufacture, and to

prevent fraudulent Imitations,



we call particular attention

to our Trade Mark, as here

shown.

"It follows, with the persistence of a law, that originators should be beset by imitators, just as in the natural world the finest organic forms are most liable to parasitical growth."—Miss METEYARD'S *Life of Josiah Wedgwood, the Potter*.

In all instances please specify "**MORGAN'S PATENT**," and address to—**BATTERSEA WORKS, LONDON, S.W.**

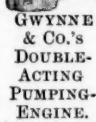
Complete Illustrated List forwarded on application.





**GWYNNE & CO.'S  
IMPROVED PLUNGER  
HAND PUMP.**

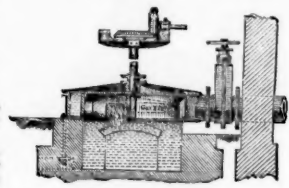
A very neat and extremely compact arrangement; will work for years without getting out of order. These pumps are particularly adapted for mines, for which great numbers have been supplied in situations where no other pump could be applied for want of space. They are equally adapted for use as feed-pumps, by driving them with strap from a rigger in place of the fly-wheel.



**GWYNNE & CO.'S  
DOUBLE-ACTING  
PUMPING  
ENGINE.**

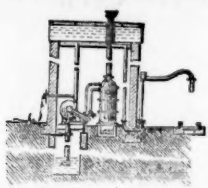
As supplied to the Admiralty for Graving.

**GWYNNE & CO.'S  
IMPROVED  
CHAIN-PUMP,  
Worked direct by  
Steam-Engine.**  
These pumps work without valves or packing, and raise a considerable quantity of water. They will lift sand, mud, or grit without choking, and require only very strong and inexpensive repairs. compact.



**GWYNNE & CO.'S  
IMPROVED TURBINE  
WATER-WHEEL.**

Compact, easy to erect, economical, simple, and perfectly adapted to all situations. Made of every power from 1 to 300 horse. These turbines are adapted for every class of work. Prices on receipt of particulars.

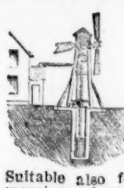


**GWYNNE & CO.'S  
PATENT COMBINED STEAM-PUMP,**  
As Applied to Railway Stations.  
The vertical boiler supplies the engine with steam, the pump discharging the water lifted from the well into the tank above, whence it may be drawn as occasion requires, for feeding locomotives, washing the carriages, as a fire-engine, &c. Estimates given.



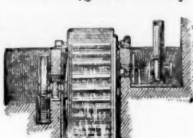
**GWYNNE & CO.'S  
IMPROVED PORTABLE  
STEAM-ENGINE.**

Light, simple in construction, durable, and economical, and very superior to "agricultural" engines. From 2½ to 30 horse power.



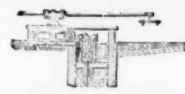
**GWYNNE & CO.'S  
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PUMPING  
MACHINERY.**

Suitable also for supplying the For situations where steam, water, or wind power are not available. Portable, easy to erect, and not liable to get night without attention. Made out of order. From 1 to 6 horse power. from ½ to 20 horse power.



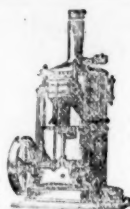
**GWYNNE & CO.'S  
PATENT WATER POWER  
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Extremely useful wherever water-power is available. The centrifugal pump is worked by gear from the water-wheel. Suitable for supplying country mansions with water. No expense when once fitted. Made of all powers.



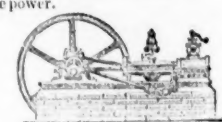
**GWYNNE & CO.'S  
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HORSE POWER  
PUMPING MACHINERY.**

For situations where steam, water, or wind power are not available. Portable, easy to erect, and not liable to get out of order. From 1 to 6 horse power.



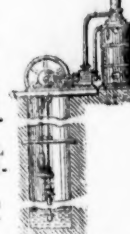
**GWYNNE & CO.'S  
IMPROVED  
VERTICAL  
STEAM-ENGINE.**

Occupies little space, compact, safe, and easy to work. Made from the very best selected materials. Of all powers from 2 to 20 horse.



**GWYNNE & CO.'S  
IMPROVED HORIZONTAL  
HIGH-PRESSURE STEAM-  
ENGINE.**

With or without expansion gear, for economical working. From 4 to 100 h. p.



**GWYNNE & CO.'S IMPROVED DEEP  
WELL PUMP.**

Worked direct by steam engine at the mouth of the well. This arrangement is invaluable in situations where, from peculiar circumstances, the centrifugal pump is inapplicable.

**ELEVEN PRIZE MEDALS, taken at the Exhibitions of the Principal Cities of the World, TESTIFY TO THE GREAT EXCELLENCE OF THIS MACHINERY.**

TO PREVENT MISTAKES, PLEASE ADDRESS IN FULL—  
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**LANGLEY MILL, NEAR NOTTINGHAM,**

Are now making Cast-Steel suitable for Tools, Taps, Dies, Chisels, &c., &c., Shear Steel, and Iron of a very superior quality, by their direct process, under the superintendence of the Patentee.

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ST. GEORGE'S IRONWORKS, HULME, MANCHESTER,**

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FLY WHEELS, DRIVING PULLEYS, AND DRUMS**

CAN BE SUPPLIED BORED AND TURNED, IF REQUIRED.  
CATALOGUES ON APPLICATION.

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PARIS EXHIBITION, 1867, GOLD MEDAL.

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At the Great Triennial Trials of the ROYAL AGRICULTURAL SOCIETY OF ENGLAND, held at Bury St. Edmunds, July, 1867, received the following AWARDS:—

For Single Cylinder Portable Steam Engine,—THE FIRST PRIZE OF £25.

For Double Cylinder Portable Steam Engine,—THE FIRST PRIZE OF £25.

For Horizontal Cylinder Fixed Engine,—THE FIRST PRIZE OF £20.

For Double Blast Finishing Thrashing Machine,—THE PRIZE OF £15.

Also, THE SOCIETY'S SILVER MEDAL for ADJUSTING BLOCKS for Machines.

The duty performed by all C., S., and Co.'s Engines on this occasion considerably exceeded that of any others. C., S., and Co. refer with pleasure to the fact that the duty of their "Commercial" or Single Valve Engine at Chester, so long ago as 1858, was not equalled by any "ordinary" Engine at Bury.

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And 78, LOMBARD STREET, LONDON.**

**DAVIS AND PRIMROSE,  
LEITH, N.B.,  
STEAM HAMMERS,**

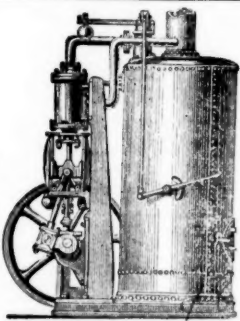
1½ cwt., 3 cwt., and 5 cwt., sizes, always in stock or progress.

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From 2 to 20-horse power. Small sizes usually ready for delivery.

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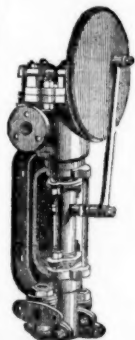


**ALEXANDER WILSON AND CO., ENGINEERS,  
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MANUFACTURERS OF

**IMPROVED DONKEY PUMPS,**

INJECTORS, SAFETY VALVES, STOP VALVES, and BOILER MOUNTING of every description.



Special attention is called to their IMPROVED DONKEY PUMPS or INJECTORS, which are the best boiler feeders yet brought before the users of steam power. For boilers supplying steam to apparatus other than a steam-engine they are indispensable, and are rapidly supplanting the use of the feed pipe on the engine. They are also used for a great variety of other purposes. They are produced at a price which defies competition, and enables them to be supplied to those countries where a heavy duty has to be paid, in addition to the cost of carriage. They are used by all the leading firms of engineers at home and abroad. A stock of one hundred always on hand, from which orders can be executed without delay.

**REDUCED PRICE LIST. Those marked \* are double-acting.**

Size.	Diameter.	Stroke.	Galls. thrown per hour.	H.P. of boiler supplied.	Price.
4	1½	2½	150	10	£ 6 10 0
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6	1½	4	460	30	11 0 0
7	2½	4	690	40	13 0 0
*8	2½	4	920	60	15 10 0
9	2½	6	1200	75	17 0 0
*10	2½	6	1800	120	19 0 0

**PATENT FLEXIBLE TUBING,  
AND BRATTICE CLOTH FOR MINES**

MANUFACTURED BY

**ELLIS LEVER,**

**WEST GORTON WORKS, MANCHESTER.**

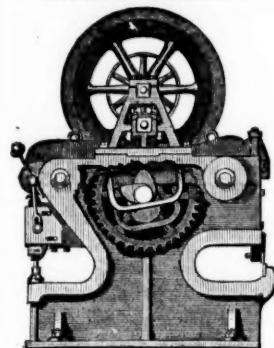


### BICKFORD'S PATENT SAFETY FUSE

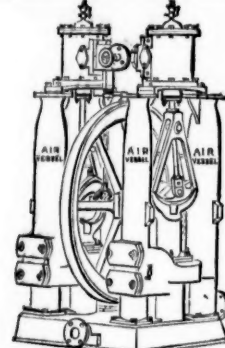
Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1862, in London; at the "IMPERIAL EXPOSITION" held in Paris, in 1855; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; and at the "UNIVERSAL EXPOSITION," in Paris, 1867.



**BICKFORD, SMITH, AND CO.,**  
of TUCKINGMILL, CORNWALL, MANUFACTURERS of PATENT SAFETY-FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—  
EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH the COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.



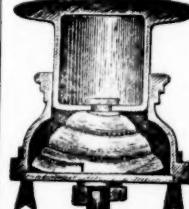
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PUNCHING AND SHEARING  
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1½ x 1¼ in. x 24 in. = 8 tons, £185.  
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From 2 to 12 in. diameter.  
SINGLE AND DOUBLE-ACTING  
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CAST STEEL for PUNCHES, TAPS, and DIES, TURNING TOOLS, CHISELS, &c.  
AST STEEL PISTON RODS, CRANK PINS, CONNECTING RODS, STRAIGHT and CRANK AXLES, SHAFTS and FORGINGS of EVERY DESCRIPTION.  
DOUBLE SHEAR STEEL, FILES MARKED  
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Locomotive Engine, Railway Carriage and Wagon Springs and Buffers.  
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MEAT BISCUIT FOR DOGS, made by the CARLISLE BISCUIT COMPANY, is undoubtedly the best and cheapest food for dogs that has ever been introduced. It is equally adapted for sporting dogs, yard dogs, or for pets. It requires no cooking, and, without any other food, keeps dogs in the highest condition. Many of the prize-taking dogs at the last Birmingham show were fed, from puppies, on this biscuit. Price 20s. per cwt. at Carlisle; or at their depot, 56, City-road, London, 22s. per cwt. Post-office orders payable to WILLIAM SLATER, Carlisle. Sold by corn chandlers everywhere. Book of testimonials from well-known country gentlemen, sent on application. Agents wanted. WILLIAM SLATER Managing Director.

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Reference to the leading Physicians of the day.  
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LETTERS RECEIVE PROMPT ATTENTION.

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showing the true causes of Nervous, Mental, and Physical Debility, loss of Spirit, Indigestion, Want of Energy, Premature Decline, with plain directions for perfect restoration to health and vigour in a few days, WITHOUT MEDICINE.  
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20 Chiverton, £1 1/2, 50 Chontales, £2 12s. 6d., 10 Treilway, £7 1/2, 30 New Seton, 30 Snaefell, 20 New Westminister, Tamar Valley, 40 East Rosewarne, 20 New Westminister, Tamar Valley, 50 Crebor, 9s, 10 Marke Valley, £9 1/2, 20 Kitty (St. Agnes), 20 Kitty (St. Agnes).

\* All shares having no price quoted, we are in a position to deal in at the market price of the day.

OFFER WANTED—30 Cardiganshire Lead Mine shares, £17 10s. paid.

We strongly recommend the purchase of New Clifford Copper and Tamar Valley Silver-Lead shares at present prices. Full particulars of both these properties on application.

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STOCK AND SHARE DEALERS, No. 160, GRESHAM HOUSE, OLD BROAD STREET, LONDON, TRANSACT BUSINESS, for cash or account, in Stock Exchange or other Securities.

Our "Guide" for the present month is now ready, and can be had free upon application. It contains particulars of the best paying and safest Progressive Undertakings, Stocks, Debentures, Bonds, and Shares.

A daily Price List, showing the latest quotations, with special remarks upon Mines, Banks, Railways, Gas, and Water Companies, together with English and Foreign Stocks and other Securities.

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## THE MINING SHARE LIST.

## BRITISH DIVIDEND MINES.

Shares.	Mines.	Paid.	Last Pr.	Bus. done.	Total divs.	Pershare.	Last paid.
1500 Alderley Edge, c. Cheshire	10 0 0	—	—	—	10 1 8	0 10 0	July 1868
2000 Botallack, c. St. Just	91 5 0	—	—	—	488 15 0	5 0 0	May 1866
4000 Brookwood, c. Buckfastleigh	111 0	—	—	—	0 12 6	0 2 6	Aug. 1868
1000 Broadford, c. Cardigan	12 0 0	—	—	—	10 7 0	0 6 0	Oct. 1868
5094 Bwlch Consols, s-l, Cardigan	4 0 0	—	—	—	0 3 0	0 1 6	Aug. 1868
6400 Cashwell, c. Cumberland	2 10 0	—	—	—	15 5 0	0 10 0	Oct. 1868
916 Cargill, s-l, Newlyn	15 5 21	19 20	—	—	0 6 0	0 6 0	Oct. 1868
1280 Chanticleer, l	0 7 8	—	—	—	1 12 0	0 5 0	Oct. 1868
2450 Cook's Kitchen, c. Illogan	19 14 9	13	12 13	—	2 5 0	1 5 0	April 1868
509 Creaghawase and Penkelt, l	7 10 0	—	—	—	29 3 0	0 15 0	Oct. 1868
867 Cwm Eirin, l, Cardiganshire	6 0 0	—	—	—	383 10 2	0 0 0	Aug. 1868
128 Cwmystwith, l, Cardiganshire	300 0 0	—	—	—	177 0 0	2 10 0	July 1868
280 Derwent Mines, s-l, Durham	1 0 0	390	—	—	1115 0 0	0 6 0	Sept. 1868
1024 Devon Gt. Consols, c. Tavistock	49 14 6	19	17 19	—	0 10 0	0 10 0	Sept. 1867
656 Ding Dong, c. Gwulva	128 17 6	370	350 380	—	857 10 0	5 0 0	Oct. 1868
358 Dolcoath, c. l, Camborne	2 14 6	5	5 5 1/2	—	14 11 6	0 2 0	July 1867
6144 East Cardigan, c. St. Cleer	32 0 0	—	—	—	160 10 0	2 0 0	July 1868
308 East Darren, l, Cardiganshire	24 5 0	—	—	—	447 10 0	5 0 0	Nov. 1868
128 East Pool, l, c. Pool, Illogan	3 9 0	—	—	—	4 1 6	0 10 0	May 1868
1906 East Wheel Lovell, l, Wendron	25 0 0	—	—	—	72 0 0	0 10 0	Sept. 1868
2800 Foxdale, l, Isle of Man	3 18 6	3 1/2	3 1/2	—	8 5 6	0 5 0	Feb. 1866
6000 Frank Mills, l, Christow	3 10 6	—	—	—	0 3 0	0 3 0	Jan. 1868
3550 Gawton, c. Tavistock	4 0 0	20 1/2	21 1/2	—	9 5 0	0 10 0	Sept. 1868
15000 Great Laxey, l, Isle of Man	40 0 0	14	13 13 1/2	—	13 11 0	0 7 6	Sept. 1868
5098 Great Wheal Vor, l, c. Helston	8 10 0	46	44 46	—	48 0 0	1 10 0	Oct. 1868
1024 Herodfoot, l, near Liskeard	5 10 6	—	—	—	0 10 0	0 5 0	April 1866
6000 Levant, c. l, St. Just	10 1 8	—	—	—	1095 0 0	2 0 0	July 1868
400 Lisburne, l, Cardiganshire	18 15 0	—	—	—	509 0 0	0 0 0	July 1868
3000 Maes-y-Safn, l, Flint	20 0 0	—	—	—	4 0 0	0 5 0	Oct. 1868
9000 Marke Valley, c. Cardigan	4 10 6	8 1/2	9 1/2	—	4 14 0	0 5 0	Oct. 1868
3000 Minera Boundary, l, Wrexham	1 0 0	—	—	—	0 13 0	0 3 0	Mar. 1866
1800 Minera Mining Co., l, Wrexham	25 0 0	—	150 175	—	289 13 0	6 0 0	Aug. 1868
20000 Mining Co. of Ireland, c. l, c.	7 0 0	14 1/2	13 1/2	—	—	9 p.c.	July 1868
4000 Wynndy Iron Ore	50 0 0	—	—	—	0 8 6	0 2 0	Mar. 1868
200 Parys Mines, c. Angles	50 0 0	—	—	—	162 10 0	2 10 0	Aug. 1868
12800 Prince of Wales, l, Calstock	0 12 6	2 1/2	28s. 40s.	—	0 7 6	0 1 0	Aug. 1868
1120 Providence, l, Uny Lelant	10 6 7	28	26 28	—	85 12 6	0 10 0	Sept. 1868
512 South Cardigan, c. St. Cleer	1 5 0	—	—	—	597 10 0	5 0 0	Oct. 1868
6000 South Darren, l, Cardigan	3 6 6	—	—	—	0 13 0	0 1 6	Aug. 1868
937 South Wh. Croft, c. Illogan	24 10 10	14	12 13	—	1 0 0	0 10 0	Sept. 1868
496 So. Wh. Frances, c. Illog. l	18 18 9	20	17 20	—	374 13 6	1 0 0	Mar. 1868
608 Summer Hill, l, Mold	3 18 6	—	—	—	2 5 6	0 1 0	Feb. 1868
6000 Turof, c. l, Pool, Illogan	9 0 0	17	16 17	—	19 15 0	0 5 0	Sept. 1868
2000 Trumpet Cons., l, Helston	11 10 0	15	13 14	—	13 1 0	0 10 0	Oct. 1868
3000 W. Chiverton, l, Perranzabuloe	10 0 0	62	61 62	—	29 7 6	2 0 0	Aug. 1868
5000 West Godolphin, l, c. Breage	0 1 0	—	—	—	0 2 0	0 2 0	Dec. 1867
400 W. Wheal Seton, c. Camborne	47 0 0	205	190 195	—	610 0 0	5 0 0	Oct. 1868
612 Wheal Basset, c. Illogan	5 2 6	65	70 75	—	632 10 0	1 0 0	June 1868
1024 Wheal Friendship, c. Tavistock	20 0 0	—	—	—	300 10 0	0 10 0	Nov. 1868
612 Wheal Jane, s-l, Kea	10 0 0	43	40 42	—	—	1 0 0	July 1868
4225 Wheal Killy, c. St. Agnes	5 6 6	3 1/2	3 1/2	—	8 9 0	2 2 0	Aug. 1868
1024 Wheal Mary Ann, l, Menheniot	8 0 0	—	19 20	—	66 0 0	0 17 6	Sept. 1868
80 Wheal Owles, l, St. Just	7 0 0	—	—	—	350 13 0	7 10 0	Feb. 1868
896 Wheal Seton, c. l, Camborne	68 10 0	50	50 52 1/2	—	254 15 0	2 0 0	Feb. 1868
3000 Whitewell Lead, Clitheroe	0 5 0	—	—	—	1 0 0	0 10 0	Dec. 1867
17000 Wicklow, c. l, Wicklow	2 10 0	11 1/2	10 11 1/2	—	49 1 0	0 5 0	Oct. 1868

## FOREIGN DIVIDEND MINES.

35000	Alamillos, l, Spain*	2 0 0	—	..	1½ 1½	..	0 4 6	0 2 0	Sept. 1868
20000	Australian, c. South Australia†	7 7 6	—	..	—	..	0 1 6	0 6 0	Aug. 1868
16000	Cape Copper Mining*	7 0 0	—	..	12 12½	..	3 2 6	0 10 0	Feb. 1868
30000	Central American Association†	1 10 0	—	..	1 1½	..	—	—	—
71612	Don Pedro North del Rey†	14 0 0	4	..	3½ 4	..	1 0 3	0 3 0	Sept. 1868
70000	English and Australian, c.	2 0 0	—	..	—	..	1 11 0	0 2 6	Sept. 1868
20000	Fortuna, l, Spain*	2 0 0	—	..	1½ 2	..	23 10 0	0 15 0	June 1867
20000	Gen. Mining Assoc., c. Nova Scotia	20 0 0	—	..	—	..	10 per cent.	—	Aug. 1868
10000	Gonessa, l*	5 0 0	—	..	—	..	0 1 0	0 6 0	Nov. 1868
68000	Kapunda Mining Co., Austr.†	1 0 0	—	..	—	..	11 15 0	0 3 4	Sept. 1868
15000	Linares, l, Spain*	3 0 0	—	..	2½ 3	..	—	—	Yearly
50000	Pannellito, c. Chili*	3 0 0	—	..	—	..	10 per cent.	—	—
6000	Peel River Land and Mineral*	100 0 0	—	..	—	..	5 6 2	0 11 1½	May 1868
10000	Port Phillip, c. l, France*	20 0 0	—	..	10 12	..	1 3 0	0 1 0	Oct. 1868
120000	Scottish Australian Min. Co.†	1 0 0	—	..	2	..	8 p.c.	—	May 1868
11000	St. John del Rey, Brazil*	15 0 0	18	..	17 18	..	81 10 0	4 5 0	Dec. 1867
13500	Vancouver Coal Mining†	6 0 0	9½	..	8½ 9	..	2 2 6	—	Nov. 1868
50000	Victoria (London) [25000 £1 pd., 25000 12s. 6d. pd.]	0 5 0	—	..	—	..	0 9 7	0 7 0	July 1868
40000	West Canada Mining Co. *	1 0 0	—	..	—	..	0 19 6	0 2 6	May 1866

## NON-DIVIDEND FOREIGN MINES.

Shares.	Mines.	Paid.	Last Pr.	Bus. done.	Last Call.
50000 Anglo-Argentine, s. Argentine Republic*	1 0 0	—	—	—	—
100000 Anglo-Brazilian, g†	0 10 0	—	—	—	Nov. 1866
12500 Anglo-Italian, g	0 10 0	—	—	—	Jan. 1868
20000 Australian, g	1 0 0	—	—	—	Mar. 1868
2464 Burra Burra, c. South Australia†	5 0 0	—	—	—	—
20000 Capula, s. Mexico*	1 17 6	—	—	—	May 1866
30000 Chontales, g. s. Nicaragua†	5 0 0	—	—	—	Mar. 1868
12000 Cobre Copper Company, c. Cuba†	45 10 0	—	—	—	Jan. 1868
10000 Copalaco Mining Company, Chili†	16 10 0	—	—	—	—
10000 Copalaco Smelting, Chili†	10 0 0	—	—	—	April 1866
300 Copper Miners' Co. of South Australia†	150 47 6 pd.	—	—	—	Nov. 1866
15000 El Guaco Silver Mine Reduction Company*	2 0 0	—	—	—	Nov. 1868
40000 Fortune Copper Mining Co. of Western Australia	2 0 0	—	—	—	Fully pd.
50000 Frontino and Bolivia, g. New Granada*	1 17 6	—	—	—	May 1868
10000 Great Barrier Land, Mining, &c., New Zealand	5 0 0	—	—	—	Fully pd.
80000 Great Northern, c. South Australia†	1 11 6	—	—	—	Sept. 1862
50000 Javali, g. Nicaragua	1 0 0	—	—	—	June 1868
7927 Lusitanian (Portugal)†	2 15 0	—	—	—	Dec. 1866
88640 Marikuita, g. s. New Granada	1 0 0	—	—	—	Feb. 1868
12500 Nerbudda Coal and Iron, India†	6 0 0	—	—	—	Dec. 1867
51000 New Quebrada, c. Venezuela†	2 0 0	—	—	—	—
50000 Potosi, c. New Granada	2 0 0	—	—	—	—
80000 Postarena United, g. Italy†	2 17 6	—	—	—	Fully pd.
10178 Rhens Consolidated, [6000 £5 pd., 4178 £2 10s. pd.]	—	—	—	—	May 1866
100000 Riosa Grande, g. Brazil†	0 14 0	—	—	—	June 1867
15000 San Pedro del Monte, s. Mexico*	4 0 0	—	—	—	Sept. 1866
10000 San Roque, l. Spain	5 0 0	—	—	—	Fully pd.
10000 Sao Vicente, Brazil†	1 0 0	—	—	—	Oct. 1868
100000 Taquaril, g. Brazil†	0 7 6	—	—	—	Oct. 1868
6000 Terresun, s-l, Isle of Sardinia	2 2 6	—	—	—	—
41000 Texas San, s. Mexico†	28 5 2	—	—	—	May 1868
10000 Val Antioria, Italy	2 2 6	—	—	—	—
6000 Val Sassam, s. c. l, Italy	8 0 0	—	—	—	Aug. 1868
45000 Victor Emanuel, c. Italy*	1 0 0	—	—	—	Fully pd.
20000 Washoe, c. Nevada†	5 0 0	—	—	—	Fully pd.
80000 Worthing, c. South Australia†	1 0 0	—	—	—	Fully pd.
75000 Yorke Peninsula, South Australia	1 0 0	—	—	—	Fully pd.
50000 Yudanamatuna, c. South Australia†	3 0 0	—	—	—	Fully pd.